DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

SCIENCE SERVICE

DIVISION OF BOTANY AND PLANT PATHOLOGY

J. H. CRAIGIE
Dominion Botanist

K. W. NEATBY
Director

TWENTY-FIFTH ANNUAL REPORT OF THE CANADIAN PLANT DISEASE SURVEY 1945

Compiled by:
I. L. CONNERS
Associate Plant Pathologist

D. B. O. SAVILE
Junior Plant Pathologist

Digitized by the Internet Archive
in 2025

https://archive.org/details/canadian-plant-disease-survey_1945_25

FOREWORD

As in previous reports, the Twenty-Fifth Annual Report contains several special accounts. They are: "Survey of Rust Nursery Material for Plant Diseases in 1945" and "Physiologic Races of Cereal Rusts in Canada in 1945" by T. Johnson, B. Peturson and W.J. Cherewick, "Flax Diseases in Saskatchewan in 1945" by T.C. Vanterpool and a similar report for Manitoba by W.E. Sackston, "Soybean Diseases in Southwestern Ontario in 1945" by A.A. Hildebrand and L.W. Koch, "Pea Diseases in Northeastern Saskatchewan in 1945" by H.W. Mead and a report on tobacco diseases by L.W. Koch.

Our thanks are due to all who have contributed to the Survey. Principal contributors outside the Division of Botany and Plant Pathology were: Dr. J. Emile Jacques, Prof. J.E. Howitt, Dr. J.D. MacLachlan, Mr. Fernand Godbout, Mr. Omer Caron, Mr. T. Simard, and Mr. R. Pelletier, and all of the District Potato Inspectors. Mr. Albert Payette undertook the translation of "New and Noteworthy Diseases" for the benefit of our French readers.

10 July 1946,
Division of Botany and Plant Pathology,
Central Experimental Farm,
Ottawa, Canada.

I.L. Conners,
Associate Plant Pathologist.

D.B.O. Savile,
Assistant Plant Pathologist.

New or Noteworthy Diseases

Observations on the rusts of wheat and oats in 1945 revealed some notable contrasts with previous years. Stem rust (Puccinia graminis) of wheat was virtually absent in fields of stem rust resistant varieties in Man., but the amounts of rust recorded on susceptible varieties grown experimentally, indicated that a rather severe epidemic with heavy losses would have developed if the farmers in Man. were still dependent on the old susceptible varieties. Leaf rust (Puccinia triticina) of wheat was generally severe in most parts of Canada except in the dry areas of Alta. and western Sask. Moreover, wheats such as Regent and Renown that have been resistant in previous years were almost as heavily rusted as Thatcher due apparently to the prevalence of races of leaf rust to which they are susceptible.

Crown rust (Puccinia coronata) of oats was very prevalent in Man. and appeared in epidemic form in many localities in Ont., Que., and the Maritime Provinces. The season was unusually favourable for rust development in eastern Ont, Erban and other varieties possessing a similar type of resistance suffered wide-spread damage from crown rust, in marked contrast to the resistance displayed by Erban in 1938 when it was first being grown extensively. The failure of Erban and related varieties was due to the increasing prevalence in recent years of races of crown rust to which these varieties are susceptible. Likewise, stem rust of oats was rather severe in Man. and eastern Sask. and locally in parts of Eastern Canada. Ajax, previously resistant, was heavily rusted in most of Man. and Vanguard bore more rust than in past years. The explanation is to be found in the unprecedented prevalence of races to which these varieties are susceptible. The severity of stem rust in localized areas in eastern Ont. focussed attention on the importance of the barberry in initiating local epidemics and a campaign is in progress to eradicate the barberry and buckthorn, the alternate host of crown rust, in the eastern counties of Ont.

Take all (Ophiobolus graminis) was definitely more prevalent than usual. It was common and in some fields severe in northeastern Sask. In Man., where the disease is rarely recorded, a severe outbreak was noted in one field. Take all appears to be increasing in winter wheat in southern Ont. and it was recorded for the first time at Ste. Anne de la Pocatière, Que. Some interesting calculations are given by Vanterpool on the increased returns through the use of phosphate fertilizers in the control of browning root rot (Pythium spp.) of wheat in Sask.

Johnson has continued his observations on the Septoria diseases of cereals in Canada. He presents additional evidence on the occurrence of a strain of Septoria, which closely resembles S. Avenae, but which occurs must abundantly on fading leaves of wheat, and to a limited extent on rye, barley and oats. It is incapable of attacking thrifty oat seedlings and therefore is pathogenically quite distinct from S. Avenae.

Bacterial wilt (Corynebacterium insidiosum) of alfalfa has now spread in Alta. into the northern seed-producing areas; it was also reported for the first time in Man. Crown rot (low-temperature basidiomycete) was not particularly destructive this year in Alta.; however, it was found for the

first time in southern Sask., at Swift Current. Crown wart (Urophlyctis Alfalfae), a new disease of alfalfa in Canada, was observed in the plots of the University of British Columbia and in 2 fields at Chilliwack.

Most parasitic diseases of flax were generally light in Sask. Seedling blight (Rhizoctonia Solani) caused some damage and root rot (miscellaneous fungi) affected yields in some areas. On account of the low rainfall over wide areas in Sask., yields were below average and physiological troubles were more conspicuous. Rust (Melampsora Lini) caused little damage largely due to the replacement of susceptible varieties by resistant or immune sorts. A destructive foot rot, due to a species of Phoma, tentatively identified as P. exigua, was recorded for the first time. Some of the parasitic diseases tend to show certain host and geographical limitations. Anthracnose (Colletotrichum Lini) seems primarily a disease of fibre flax in eastern Canada. Stem break and browning occurs mostly on oil flax in Alta. and Sask. This year seed infection by Polyspora Lini was more in evidence in samples from the dark soil zone of Sask. while several samples from the park belt carried Alternaria linicola. The latter has not yet been detected in the field. Again pasmo (Septoria linicola) has been found most frequently on oil flax in Man.

Bacterial ring rot (Corynebacterium sepedonicum) is still one of the most important diseases of potatoes and is receiving increasing attention each year in Canada. It has been demonstrated that even where the disease has been allowed to become thoroughly established it can be brought rather quickly under control provided vigorous measures are taken to detect its prevalence and to halt its further spread. Ring rot is no longer a serious menace to the certified seed industry, but it will continue to be a problem as long as the disease occurs in the commercial crop. The percentage of rejections in each province on account of ring rot appears to be a measure, in the first place, of its incidence in table stocks and, in the second, of the effectiveness of the local measures adopted for its control.

Bacterial ring rot has yet to be reported in N.S. grown potatoes. Its occurrence in P.E.I. and B.C. is limited to sporadic infections. Only 3 additional cases were found in P.E.I. and one outbreak of 10 cases was uncovered in the Comox district, B.C. In Alta., where ring rot became thoroughly established in the principal potato-growing areas in the southern part of the province and caused severe losses from 1940 onwards, the disease is definitely on the wane. Ring rot was found in only 137 fields out of 1198 inspected in 1945 and the average infection was under 3%. There were also in Ont. fewer cases found and of these fewer were on farms where the disease had been present before. Ring rot has reached epidemic proportions in Man. and an organized campaign to bring the disease under control is urgently needed. Observations in Sask. have been limited, but from the larger number of cases found in 1945, an extended survey for ring rot is highly desirable. Although ring rot has been known the longest in Que. and N.B., the disease is far from being under control to judge from the meagre reports received from these provinces.

In general, late blight (Phytophthora infestans) was less destructive than usual in Canada in 1945. In several provinces blight developed very early and conditions appeared extremely favourable, but before the disease became epidemic, a dry spell intervened. Occasionally tuber rot was severe in limited areas particularly in the late crop. Pink rot (Phytophthora erythroseptica) which was first recognized in B.C. in 1943 has now been reported from Man. and Que.

The potato rot nematode (Ditylenchus destructor), another newcomer to Canada, was found at York and Uigg, P.E.I.

A study of the trends in mosaic and leaf roll rejections in fields entered for certification in recent years indicates that the incidence of mosaic in the crop is dependent in general on the initial freedom of the seed from infection. On the other hand, the occurrence of leaf roll appears to be correlated with the abundance and activity of the aphid population. Mosaic has reached very low levels in the certified seed crop, but a severe epidemic of leaf roll in N.B. resulted in the rejection of 793 fields out of 2746 inspected.

Only a few of the more important observations on other diseases of vegetables may be included. Last year, charcoal rot (Macrophomina Phaseoli) was reported on soybeans in southwestern Ont. It was not recorded again on this host, but it was found to be abundant on plants of navy beans in fields on dry sandy soil in the same area. The bacterial blights, particularly halo blight (Pseudomonas medicaginis var. phaseolicola), appear to be increasing in Canada. The freedom from disease of seed grown in the Kamloops district, B.C., as well as in California (Calapproved seed), when grown in areas where the disease is destructive has stimulated interest in the possibility of producing disease-free stocks in Canada under a system of certification. For the second year a downy mildew of economic importance has been recorded in the B.C. Interior; last year it was the onion downy mildew (Peronospora destructor); this year, the beet downy mildew (P. Schachtii). Fusarium wilt (F. oxysporum) is proving a very destructive disease in important melon-growing areas in Ont. Neck rot (Botrytis Allii) was more destructive than usual in stored onions, due to the wet fall of 1944; storage conditions, however, were not always the best. Yellow dwarf (virus), a new disease of onion in Canada, was found in the B.C. Interior. Carrot yellows (virus) was generally much less severe than in 1944; the same was true of purple or bunch top (virus) of potatoes. Observations made this year in Ont. indicate that Alternaria Raphani can be a destructive pathogen of the radish seed crop. The disease has been named Black Pod Blotch. A strain of Cladosporium fulvum capable of attacking the variety Vetomold 121 of tomatoes has now appeared in B.C. and has become quite prevalent in southwestern Ont.

Discussion of the diseases of fruits, trees and shrubs, and ornamentals is of necessity limited to a few miscellaneous items in the paragraphs below.

Apple scab (Venturia inaequalis) was exceptionally serious from Ont. eastward; defoliation and loss of crop was common in poorly sprayed orchards. What is feared to be stony pit (virus) of pear was found in Ont. for the first time in eastern Canada. Cherry leaf spot (Higginsia prunophorae) was unusually severe in southern Ont. The rapid spread of little cherry (virus) in B.C. is causing concern. Brown rot (Sclerotinia fructicola) of peaches caused heavy losses in the Niagara Peninsula. Downy mildew (Plasmopara ribicola) of gooseberry was found in Ont., this being the first record of its occurrence in Canada. Anthracnose (Elsinoe veneta) of raspberry caused heavy damage to the variety Taylor in Ont. Decline (virus), first reported on Cuthbert, is spreading in other raspberry varieties in B.C. Grape downy mildew (Plasmopara viticola) was more abundant than usual in Ont. Red stele (Phytophthora

Fragariae), recently recognized for the first time in B.C., has been shown to be well established and to have caused heavy loss in the Fraser Valley. June Yellows (genetic breakdown) of strawberry was unusually prevalent in Premier in eastern Canada.

Melanconis Juglandis was found on Juglans cinerea in Que. Taphrina virginica was collected on Ostrya virginica in Ont. Marssonina Castagnei seems to have been unusually abundant in many districts; it was extremely heavy on Populus alba at Ottawa, causing early defoliation, and was moderately heavy on P. tremuloides in B.C., Sask., Ont., Que., and N.S. Dutch elm disease (Ceratostomella Ulmi) has been found to be considerably more widespread in Que. than the preliminary scouting late in 1944 indicated.

Yellows (Callistephus virus 1) was widespread and severe on many composites and some other ornamentals in the Maritime Provinces, although the virus caused less damage in carrots than in 1944. The need for study of this disease complex and its vectors is more and more apparent. The diseases of gladiolus, notably yellows (Fusarium oxysporum), scab (Pseudomonas marginata) and dry rot (Sclerotinia Gladioli) were again conspicuous, not merely because of the numerous requests for information but because of the size of the industry concerned. A Phyllosticta agreeing well with P. rosicola, collected in Man. and Ont., was found to be associated in each case with Cercospora rosicola and is apparently a microconidial stage of Mycosphaerella rosicola.

Other new or interesting records for ornamental plants included: Ascochyta majalis and Botrytis cinerea on lily-of-the-valley in Ont.; spotted wilt (virus) on dahlia in Man. and Que.; Urocystis Anemones on winter aconite in B.C.; Phyllosticta Ulmariae on Filipendula in Man.; Colletotrichum Liliacearum on irus in Man.; Cereosporella inconspicua on lily in Man.; Uromyces Holwayi on lily in B.C.; Cercospora antipus on honeysuckle in B.C.; Xanthomonas papavericola on poppies in Ont. and Que.; Pseudomonas syringae heavy on lilac in Alta. and Man.; Botrytis Tulipae very severe on tulip at Ottawa, Ont.; Colletotrichum Violae-tricoloris on pansy at Ottawa.

Maladies nouvelles ou d'importance notable

A. Payette

Les observations de 1945 sur les rouilles du blé et de l'avoine marquent un contraste frappant avec le comportement antérieur. La rouille de la tige (Puccinia graminis) du blé a été pratiquement inexistante au Manitoba sur les variétés résistantes, tandis qu'on a rapporté de forts pourcentages de cette rouille sur les variétés susceptibles (c'est-à-dire, sujettes) cultivées pour fins d'expérimentation; on en peut déduire qu'il se serait déclaré une épidémie sérieuse entraînant de lourdes pertes si les fermiers du Manitoba n'avaient pu ensemencer que les veilles variétés susceptibles. La rouille de la feuille (Puccinia triticina) s'est, en général, manifestée à l'état grave, presque partout au Canada, sauf dans les régions relativement sèches de l'Alberta et de l'ouest de la Saskatchewan. Bien plus, on a pu noter sur des variétés de blé jusque-là résistantes, telles le Regent et le Renown, presque autant de cette rouille que sur le Thatcher, en raison, apparemment, de la propagation de certaines races de rouille de la feuille auxquelles ces variétés sont susceptibles.

La rouille couronnée (Puccinia coronata) de l'avoine a été particulièrement abondante au Manitoba et sévit à l'état épidémique en plusieurs points de l'Ontario, du Québec et des Provinces Maritimes. Dans l'est de l'Ontario, des conditions particulièrement favorables permirent à la rouille de prendre un essor inaccoutumé. La variété Erban et d'autres dotées d'une résistance du même ordre n'ont pu supporter sans dégâts importants les attaques généralisées de la rouille couronnée, ce qui marque une divergence sensible dans le comportement de cette même variété Erban, qui, lors de son introduction sous une forme commerciale in 1938, s'était montrée bel et bien résistante. La défection de l'Erban et d'autres variétés du même type s'explique par l'expansion rapide prise, ces dernières années, par certaines races de rouille couronnée auxquelles ces variétés sont susceptibles. D'une façon analogue, la rouille de la tige de l'avoine a pris plus d'importance au Manitoba et dans l'est de la Saskatchewan, ainsi qu'en maints endroits de l'est du Canada. La variété Ajax, naguère résistante, fut fortement infectée de rouille dans presque tout le Manitoba et la Vanguard en fut plus contaminée que dans la passé. On doit en trouver l'explication dans la pullulation extraordinaire de races auxquelles ces variétés sont susceptibles. La gravité de la rouille de la tige dans certaines régions de l'est de l'Ontario dirigea l'attention sur la part importante prise par l'épine-vinette dans la genèse de maintes épidémies. En conséquence, on a lancé, dans les comtés de l'est de l'Ontario, une campagne d'éradication de l'épine-vinette et du nerprun, l'hôte complémentaire de la rouille couronnée.

Le piétin (Ophiobolus graminis) a décidément agrandi son champ d'action. Dans le nord-est de la Saskatchewan, où il était commun, on a pu noter de sérieux dégâts dans quelques champs. Au Manitoba, où l'on ne mentionne que rarement cette maladie, on l'a trouvée à l'état épidémique dans un champ. Le piétin paraît se répandre progressivement dans les blés d'hiver du sud-ouest de l'Ontario, et l'on a signalé son apparition à Ste-Anne-de-la-Pocatière, P.Q. Par ailleurs, Vanterpool fournit des chiffres intéressants sur les profits à retirer de l'emploi des engrais phosphatés par la mise en échec de la pourriture pythienne (Pythium spp.) du blé dans la Saskatchewan.

Johnson a poursuivi ses observations sur les maladies que des espèces de Septoria peuvent causer aux céréales dans le Canada. Il caractérise davantage une lignée d'un Septoria très semblable au S. Avenae, mais qu'on rencontre surtout sur les feuilles de blé qui commencent à se faner et, dans une plus faible mesure, sur le seigle, l'orge et l'avoine. Cette lignée ne peut s'attaquer aux semis vigoureux d'avoine et, par conséquent, diffère tout-à-fait du S. Avenae au point de vue pathogénique.

La flétrissure bactérienne (Corynebacterium insidiosum) de la luzerne s'est propagée, dans l'Alberta, jusque dans les régions à semences du nord; on a aussi signalé pour la première fois sa présence au Manitoba. La pourriture de la couronne (Basidiomycète de basse température) n'a pas, cette année, exercé de ravages pour la peine dans l'Alberta; toutefois, on a pu noter sa première apparition à Swift Current, dans le sud de la Saskatchewan. Les tumeurs marbrées (Urophlyctis Alfalfae), une maladie de la luzerne jusqu'alors inconnue au Canada, furent observées dans les parcelles de l'Université de la Colombie-Britannique, ainsi que dans deux champs à Chilliwack.

La plupart des maladies parasitaires du lin n'ont fait que de légers dégâts dans la Saskatchewan. La fonte des semis (Rhizoctonia Solani) occasionna quelques pertes et la pourriture des racines (divers champignons) diminua les rendements dans certaines régions. Dans de vastes portions de la Saskatchewan, une faible précipitation amena une diminution dans les rendements moyens et favorisa l'éclosion de désordres physiologiques plus accentués. La rouille (Melampsora Lini) ne put causer que de faibles pertes, ce qui est surtout dû au remplacement des variétés susceptibles par d'autres plus résistantes ou immunes. On a noté pour la première fois la présence d'une pourriture du pied des plus destructives et causée par une espèce de Phoma qu'on présume être le P. exigua. Il semble y avoir, chez certaines maladies parasitaires, des particularités remarquables dans le choix de l'hôte ou d'une ère géographique. L'anthracnose (Colletotrichum Lini) paraît être avant tout une maladie du lin à filasse dans l'est du Canada. L'oxychromose polysporéenne apparaît le plus souvent dans le lin à graines (pour l'extraction de l'huile) en Alberta et dans la Saskatchewan. C'est dans les échantillons provenant de la zone à sols brun foncé de la Saskatchewan qu'on pouvait, cette année, retracer avec le plus de facilité l'infection de la semence par le Polyspora Lini, tandis que plusieurs échantillons de la zone des parcs hébergeaient l'Alternaria linicola. On n'a pas encore décelé la présence de ce dernier dans le champ. C'est encore au Manitoba, sur les variétés de lin à graines, qu'on a trouvé le plus de pasmo (Septoria linicola).

La pourriture du cerne ou flétrissure bactérienne (Corynebacterium sepedonicum) demeure l'une des maladies les plus importantes des pommes de terre et reçoit une attention toujours croissante au Canada. On a démontré que le recours à des mesures énergiques pour la dépister et l'empêcher de se propager peut assurer, en un temps relativement court, la mise en échec complète de cette maladie, si bien établie soit-elle. Sans être désormais aussi en mesure de boycotter l'industrie de la semence certifiée, la flétrissure n'en constituera pas moins un sérieux handicap à cette production tant que la maladie ne sera pas disparue de la récolte commerciale. Le pourcentage de rejets dus à la pourriture du cerne paraît être en fonction, d'abord, de sa présence dans les stocks de consommation, et ensuite, du degré d'efficacité des mesures répressives dans un endroit donné.

L'occasion ne s'est pas encore présentée de signaler l'apparition de la flétrissure dans les pommes de terre cultivées dans la Nouvelle-Ecosse. Sa présence dans l'Ile-du-Prince-Edouard et la Colombie-Britannique se limite à quelques infections sporadiques. On n'a rencontré que trois autres cas de pourriture du cerne dans l'Ile-du-Prince-Edouard et qu'une dizaine en Colombie-Britannique, ces derniers tous confinés au district de Comox. La maladie est en train de disparaître d'une façon définitive de l'Alberta où, depuis 1940, elle sévissait dans les principales régions à patates du sud. Sur 1198 champs inspectés en 1945, on n'en a trouvé que 137 de contaminés par la flétrissure et l'infection moyenne n'atteignait pas 3 pour cent. En Ontario également, les cas se font plus rares, et bien peu se sont présentés sur des fermes antérieurement contaminées. La flétrissure s'est manifestée à l'état épidémique au Manitoba où la nécessité d'organiser une campagne de répression s'impose d'urgence. Les observations ont été plutôt restreintes dans la Saskatchewan, mais une enquête d'envergure sur la pourriture du cerne serait bien à désirer, du fait qu'on y a relevé un plus grand nombre de cas en 1945. Bien que ce soit dans le Québec et au Nouveau-Brunswick qu'on connaît la maladie depuis le plus longtemps, on est loin d'y avoir remédié de façon efficace, à en juger par les maigres rapports qui nous sont venus de ces provinces.

D'une façon générale, la brûlure tardive ou mildiou (Phytophthora infestans) n'a pas exercé, en 1945, des ravages aussi considérables que par le passé dans le Canada. Dans plusieurs provinces, le mildiou s'est montré très à bonne heure et semblait devoir se développer dans les meilleures conditions, mais une sécheresse s'interposa avant qu'il n'ait atteint le stade épidémique. La pourriture des tubercules acquit occasionnellement de l'importance dans certains points, surtout dans la récolte tardive. La pourriture rose ou pourriture aqueuse (Phytophthora erythroseptica), qu'on avait d'abord décelée en Colombie-Britannique en 1943, a maintenant été signalée au Manitoba et dans le Québec.

La pourriture vermiculaire des tubercules, causée par le nématode Ditylenchus destructor, un autre nouveau-venu au Canada, a été localisée à York et à Uigg, dans l'Ile-du-Prince-Edouard.

La courbe des variations apportées par la mosaïque et l'enroulement au tableau des champs rejetés et admis pour la certification durant ces dernières années tend à montrer que la mosaïque n'apparaît généralement qu'en autant que la semence initiale en était infectée. L'enroulement, pour sa part, paraît être en fonction de l'abondance et de l'activité des pucerons. La mosaïque s'est maintenue à de très bas niveaux dans les récoltes de semence certifiée, tandis qu'une sérieuse épidémie d'enroulement sévit au Nouveau-Brunswick en 1945, entraînant le rejet de 793 champs sur 2746 champs inspectés.

On ne peut inclure ici qu'un petit nombre des plus importantes observations sur d'autres maladies de légumes. On a noté, l'an dernier, dans le sud-ouest de l'Ontario, la pourriture charbonneuse (Macrophomina Phaseoli) sur la fève soya. On n'a pas mentionné de nouveau la maladie sur le même hôte, mais on l'a trouvée en abondance sur des haricots de la même région dans des champs à sols sablonneux et secs. Les infections bactériennes, surtout la tache causée par le Pseudomonas medicaginis var. phaseolicola, font, au Canada, des progrès manifestes. Le fait qu'on peut disposer, dans le district de Kamloops, C.-B., et dans la Californie ("Calapproved seed") de semences non contaminées et susceptibles de produire, même aux endroits où la maladie a l'habitude de sévir, des plants exempts d'infection, permet d'entrevoir la possibilité d'un système de certification pour des stocks indemnes au Canada. Pour la seconde année consécutive, un mildiou d'importance économique a été noté à l'intérieur de la Colombie-Britannique: l'an dernier, c'était le mildiou (Peronospora destructor) de l'oignon; cette année, ce fut le mildiou (P. Schachtii) de la betterave. La flétrissure fusarienne (Fusarium oxysporum) s'avère très destructive dans les plus importantes régions à melon de l'Ontario. La pourriture du collet (Botrytis Allii) de l'oignon a causé plus de dégâts que d'habitude aux oignons entreposés, à cause d'un automne très humide en 1944; les conditions d'entreposage ne furent cependant pas toujours idéales. Le nanisme jaune (virus), une maladie de l'oignon nouvelle au Canada, a été trouvée dans l'intérieur de la Colombie-Britannique. La jaunisse (virus) des carottes fut, en général, beaucoup moins grave qu'en 1944; il en fut ainsi de la tige pourpre ou tige compacte (virus) des pommes de terre. Les observations de l'année en Ontario indiquent que l'Alternaria Raphani peut s'avérer un important agent pathogène des radis à graines, y causant la pourriture des siliques. Une lignée de Cladosporium fulvum capable d'atta-

quer la variété de tomates Vetomold 121 a maintenant fait son apparition en Colombie-Britannique et s'est répandue à profusion dans le sud-ouest de l'Ontario.

Les cadres étroits de cet article nous obligent à limiter notre discussion sur les maladies des fruits, des arbres et des arbustes aux quelques considérations éparses des paragraphes suivants.

La tavelure (Ventúria inaequalis) a sévi d'une façon exceptionnelle depuis l'Ontario jusqu'aux Maritimes; il n'était pas rare, dans les vergers où l'on avait négligé les arrosages, d'observer la défoliation et la perte de la récolte. Pour la première fois dans l'est du Canada, on a trouvé, en Ontario, ce qu'on craint être la pierre (virus) des poires. La tache cible (Higginsia prunophorae) du cerisier a exercé des ravages inaccoutumés dans le sud de l'Ontario. On se préoccupe, en Colombie-Britannique, de l'expansion rapide de la maladie à virus appelée "petites cerises". La pourriture brune (Sclerotinia fructicola) des pêches a causé de lourdes pertes dans la péninsule de Niagara. Le mildiou (Plasmopara ribicola) des groseillers a été localisé dans l'Ontario, ce qui constitue une première mention de cette maladie au Canada. En Ontario, l'anthracnose (Elsinoe veneta) des framboisiers a fait beaucoup de tort à la variété Taylor. En Colombie-Britannique, le déclin (virus), d'abord observé sur le Cuthbert, est en train de se propager à d'autres variétés de framboisiers. Le mildiou (Plasmopara viticola) de la vigne a été plus abondant qu'à l'ordinaire, cette année, dans l'Ontario. La stèle rouge (Phytophthora Fragariae), récemment reconnue pour la première fois en Colombie-Britannique, s'est avérée bel et bien installée dans la vallée du Fraser où des pertes considérables furent imputées. La jaunisse de juin (perturbation génétique) des fraisiers était répandue de façon exceptionnelle sur la variété Premier, dans l'est du Canada.

On a trouvé le Melanconis Juglandis sur le Juglans cinerea dans le Québec. Le Taphrina virginica a été récolté sur l'Ostrya virginica dans l'Ontario. Le Marssonina Castagnei semble s'être répandu d'une façon particulièrement abondante dans plusieurs districts; à Ottawa, il s'est abattu sur le Populus alba d'une façon si massive qu'il y a causé une défoliation précoce, tandis qu'il infecta assez fortement le P. tremuloides en C.-B., Sask., Ont., Qué., et N.-E. La maladie hollandaise de l'orme (Ceratostomella Ulmi) s'est montrée beaucoup plus répandue dans le Québec que ne l'avait indiqué l'enquête préliminaire conduite tard dans la saison en 1944.

Dans les Provinces Maritimes, la jaunisse (Callistephus virus 1) a pu causer des dégâts d'envergure à plusieurs espèces de Composées ainsi qu'à d'autres plantes ornementales, bien que le virus n'ait pas endommagé les carottes autant que l'an dernier. On se rend de plus en plus compte de l'opportunité d'étudier la nature complexe de cette maladie à virus et de ses vecteurs. Les maladies du glaïeul, notamment la jaunisse fusarienne (Fusarium oxysporum), la gale bactérienne (Pseudomonas marginata), et la pourriture sèche sclérotique (Sclerotinia Gladioli) ont été, une fois de plus mis en évidence, non seulement à cause des nombreuses demandes de renseignements, mais aussi à cause de l'importance de cette industrie. Un Phyllosticta, qu'on a pu identifier au P. rosicola et qu'on a récolté au Manitoba et dans l'Ontario, s'est trouvé constamment associé au Cercospora rosicola et paraît devoir être considéré comme une phase microconidienne du Mycosphaerella rosicola.

Entre autres item nouveaux ou intéressants dans le rapport sur les maladies des plantes ornementales, il y a lieu de mentionner les suivants: l'Ascochyta majalis et le Botrytis cinerea sur le muguet dans l'Ontario; la tache de bronze (virus) sur le Dahlia au Manitoba et dans le Québec; l'Urocystis Anemones sur l'Eranthis en C.-B.; le Phyllosticta Ulmariae sur le Filipendula, le Colletotrichum Liliacearum sur l'Iris et le Cercosporella inconspicua sur le lis au Manitoba; l'Uromyces Holwayi sur le lis en C.-B.; le Cercospora antipus sur le chèvrefeuille en C.-B.; le Xanthomonas papavericola sur le pavot dans l'Ontario et le Québec; le Pseudomonas syringae à l'état grave sur le lilas en Alberta et au Manitoba; le Botrytis Tulipae sévissant sur les tulipes à Ottawa, Ont.; le Colletotrichum Violae-tricolorus sur les pensées à Ottawa.

The Weather and Its Influence on Plant Diseases

In Alta., winter conditions were very favourable for the successful overwintering of plants. Very little winter killing occurred in winter wheat and legumes, and crown rot of alfalfa and snow mould of grasses did not cause severe damage. Seeding was delayed by a cold spring, and conditions were unfavourable for growth during a large part of the season. Except for scattered showers, there was no rain in the central areas until late July and drought was widespread. As a result, rusts and most other stem and foliage diseases did not develop until late in the season and were much less prevalent than usual. Root rot damage was also relatively slight and, in general, was obscured by drought injury. Other diseases that were retarded by the dry, cool season were bacterial blight of alfalfa on non-irrigated land, the bacterial blights of beans, and late blight of potatoes. Crop yields were generally below average, and considerable hail and frost damage occurred during the latter part of the season (M.W. Cormack).

In Sask., the weather during seeding was unusually cold, with high winds and night frosts. Soil moisture conditions were generally good over the province except in the southern portions of the southeastern, Regina-Weyburn districts and the east half of south-central and southwesterd districts. Some soil drifting occurred in these areas, and was severe at times also on the plots at Saskatoon. In the northeast, flooded fields delayed seeding until June. Germination and growth were slow until late in June, when warm weather soon dissipated the scant supply of moisture in the dry areas, but caused rapid growth in the east and northeast. Much damage was done by drought in parts of the south-central, southwest and west-central areas. In these areas, drought and browning root rot symptoms were confused. Some extremely high temperatures at the end of the second week in June intensified damage by browning. Rapid deterioration of the crops west of a line running through Regina and Saskatoon occurred during July due to continuous dry weather. Abundant moisture in the eastern zones enabled leaf rust of wheat and oats to develop and cause moderate damage. A careful survey of wheat crops in the west-central, southwest, and south-central areas revealed the presence of considerable bunt, although most of the crops were suffering from drought. The conclusion drawn is that the cold spring weather favoured early development of bunt. Smuts of coarse grains were scarce for the same reason. Moisture conditions in the northeast favoured development of leaf spots such as that caused by Septoria nodorum on wheat and Ascochyta spp. on peas (H.W. Mead).

The growing season in Sask. could generally be described as windy and cool. At Saskatoon wind velocity was above average for every month from May to September inclusive. Average temperatures were below normal for May and June, normal in July and August, and below normal in September. The west and south of the province were dry, but the east and northeast had ample moisture (T.C. Vanterpool).

During April and early May, rainfall throughout nearly all of Man. was considerably above normal; consequently seeding of cereals was delayed a week or more beyond the normal seeding dates, in most areas. The progress of the crop was further delayed by abnormally cool weather during May, June and the first two weeks in July. The average temperatures in Man. were 7° below normal for May, 5° below normal for June, and 6° below normal for the early part of July; consequently all plant growth was greatly retarded. The earliest sown wheat crops in the Winnipeg area headed about July 11, almost three weeks later than usual. From mid-July until the beginning of harvest in mid-August temperatures were slightly above normal and rainfall considerably below normal. The maturing stage of the crop (heading to harvest) was hastened by the high temperatures and low rainfall of that period, and cereal crops, in spite of their slow development during early summer, ripened only about a week to ten days later than normal.

The weather, particularly during the early part of the season, had a marked effect on the initiation and development of cereal rusts. Very heavy leaf rust infections, equalling, or even exceeding, those of the heavy leaf rust year of 1938, had developed at an early date throughout the winter wheat area of the United States, creating one of the conditions necessary for a rust epidemic in the spring wheat area, namely, the early initiation of extensive infection centres from which wind-borne spores can be carried northward. However, steady northerly winds were associated with the cool spring weather and conditions were unfavourable for the northward spread of rust spores throughout all of May and during the first week in June. During that period no rust spores were observed on spore-trap slides exposed in Man., indicating the scarcity or absence of wind-borne inoculum in the air. From mid-June onward southerly winds prevailed and wind-borne inoculum began to arrive in Man. by June 21. In early July field infections of the cereal rusts began to appear, and, although rainfall was scanty, heavy dews during the remainder of the season were favourable for spore germination, while high temperatures favoured rapid rust development; and cereal rusts, particularly leaf rust of wheat, crown rust of oats, and stem rust of oats, became very prevalent on susceptible varieties before the end of the season. However, the damage by these rusts was greatly minimized by the late arrival of spores in the spring and the consequent delay in their establishment (B. Peturson).

In the Niagara Peninsula, Ont., an unusual feature of the winter of 1944-45 was the lack of frost in the ground and the heavy snow cover that persisted from Dec. 12 to the end of February. The heavy snow cover was responsible for extensive damage to young orchards by rabbits. Winter temperatures at St. Catharines were favourable for the fruit trees, a minimum of 9° below zero being recorded. However, in areas outside the peninsula lower temperatures were experienced and injury to peach buds occurred.

Mild weather in late February melted the snow, the moisture being readily absorbed by the soil. With continued mild weather in early March fruit buds commenced to swell and dormant sprays were well advanced by the end of the month. On March 31 an all day and night rain provided conditions for peach leaf curl infection. In orchards where the dormant sprays had not been completed by this time a moderate leaf curl infection developed.

Sweet cherries were largely in full bloom the second week in April, during fair weather, and escaped loss from blossom blight. However, cool weather late in the bloom period was responsible for russeting that became apparent later as the fruit developed, and for an unusually heavy drop of fruit shortly after the shucks were shed.

Plums and sour cherries, with a somewhat later bloom period, encountered two spells of very wet weather, April 24-27 and May 3-6, the latter period being of more importance to sour cherries. Owing to low temperatures the incidence of blossom blight was small (2-19% and 15-23%) respectively. Fruit injury such as occurred on sweet cherries was induced by the low temperatures. Early Richmond cherries were markedly deformed and pitted.

May was characterized by an excessive rainfall of 4.89", the second greatest for the month in 16 years' records at St. Catharines. It rained on nineteen days and was almost continually wet from May 10-19. These conditions coincided with the latter part of the bloom period of apples and the appearance of primary scab infection. The weather favoured abundant secondary infection, as well as delaying spraying operations. Consequently scab was very serious before the end of May. It continued to develop freely with further wet weather in June, much of the foliage being completely infected. Leaf fall was quite heavy by the end of June.

The bloom period of all tree fruits was unusually extended by the abnormally low temperatures, excessive moisture and cold winds. These conditions were responsible for poor fruit set, delayed and irregular development and heavy "June drop". Strong winds and gales of May 21 caused extensive foliage injury to pears and apples, lacerating the leaves severely and causing marginal scorch. Growers confused the backened pear leaves with fire blight. This disease however, was less serious than in recent years, possibly because abnormally low temperatures during bloom checked the activity of pollinating insects, and small diurnal temperature fluctuations were unfavourable to the production of bacterial exudate.

The prolonged rain of July 14-15 was responsible for splitting of maturing cherries with consequent heavy losses. This wet spell favoured the development of cherry leaf spot (Higginsia hiemalis), which completely defoliated many orchards by late August.

Rainfall in September totalled 8.17 in., more than twice any previous figure for the month. As a result, grapes were of poor quality and growers experienced great difficulty in harvesting the crop. The wet weather brought on a late development of cherry leaf spot in orchards where adequate spraying had protected the trees against earlier infection.

The weather was generally fair during the peach harvest, with no prolonged period of high humidity; consequently brown rot did not cause undue losses, except where there was heavy insect damage (G.C. Chamberlain).

At Ottawa, Ont., there was permanent snow cover from Nov. 29 and the depth of snow built up rapidly through December to 26 in. November was mild, but from mid-December through January the weather was intensely cold. The January mean temperature of 2.9°F. was 8° below average; sunshine was unusually high at 4.2 hrs. per day. February was slightly warmer than average, but there was still 23 in. of snow at the end of the month. In March the mean temperature was 9° above average; the melting snow was quickly absorbed by the dry, unfrozen ground, and there was considerable blowing of soil from bare fields in a gale on Mar. 28. Heavy rains at the end of the month restored soil moisture and growth was rapid up to mid-April. The weather then turned cold and wet and did not improve greatly until the second week of June (v.i. under Phenological Data). Farm work was at a standstill during most of this period, and frosts caused much damage to fruit buds and to many garden plants. The average daily sunshine in May was 4.9 hrs., equal to that in March and little above the figure for January. In late June and in July rainfall was light, and temperature and sunshine were close to the average, but there were no periods of hot, dry weather. In August and September rainfall was again high but temperatures were close to normal. The warmest weather of the year occurred in early September when a maximum of 90°F. was recorded.

Some grain fields were seeded in early April; the better-drained of these produced good crops, but many others had to be reseeded. Little other seeding could be done until June. The early fields contrasted markedly with the late ones, in many of which rust infections were heavy.

The early spring and the succeeding 8 weeks of wet weather caused many foliage diseases to be unusually severe. Tulip fire was exceptionally serious and Botrytis spp. were also heavy on peony, lily and lily-of-the-valley. Development of the leaf smuts of poppy and gaillardia and of powdery mildew of phlox seemed to be hindered by the excessive rainfall (D.B.O. Savile).

Apple trees in western Que. blossomed unusually early, and the severe frosts that occurred in some sections during and immediately after bloom killed a high percentage of flowers. These late frosts were followed by exceptionally wet weather that did not permit timely sprays; consequently the apple crop reached a low mark rarely seen before. Scab was so severe in certain sections as to cause heavy defoliation. In eastern Que., where spring is later, no such damage occurred. After a hot spell in early May the weather remained cool for the rest of the month without, however, showing the extremes experienced in western Que. The flowering period extended over a month, and this condition favoured severe outbreaks of fire blight in certain localities. Infection was restricted to trees and branches in bloom. Apple scab was controlled without any difficulty by the regular sprays but was extremely severe in unsprayed orchards.

Late blight on tomatoes developed rather late in eastern Que. and caused damage to green fruit only after they were taken in for ripening. Late blight on potatoes was observed about the middle of July in western Que. but was checked by a short period of drought which favoured the spread of early blight, and leaf hoppers and other insects that were responsible for most of

the damage to potato tops. Except for a few isolated areas late blight was not of any importance in that part of the province. In eastern Que. late blight was observed in the latter part of July in a few fields, but there also it was checked until September when it became severe in many localities. However, in the Manicouagan district on the north shore of the St. Lawrence, heavy frosts about Sept. 20 killed the foliage before any late blight appeared in the fields.

During summer, heavy showers accompanied by wind caused some lodging of flax and cereals in certain localities. The excessive rains in May considerably delayed seeding operations in western Que. and on many farms growers had to re-seed their fields once or twice. September was exceedingly wet and in the eastern part of the province late blight rot of potato tubers caused much damage. Flax growers in some localities had great difficulty in harvesting the crop and consequently flax was overretted, fiber and seed being of poor quality (R.O. Lachance).

In N.B., January opened with a thaw, 1.13 in. of rain and a warm wind removing almost all of the 16 in. of snow that had covered the ground. Occasional light and moderate snowfalls occurred from Jan. 7 to Feb. 21, resulting in a coverage of 47 in. A rainstorm beginning Feb. 22 reduced the depth of snow to 31 in. but light falls increased it to 35 in. by the end of the month.

Unseasonably warm weather in March rapidly melted the snow and by the end of the month the fields were almost bare. Warm rains in late March and early April and an extremely warm second week of April rapidly thawed the ground and gave promise of an early spring. The fields dried out rapidly, meadows and pastures became distinctly green, and buds of trees and shrubs swelled considerably. However, a frost on April 15 damaged some buds, particularly of apple and raspberry, in certain locations. In the Grand Lake district strawberry plantations wintered poorly. Some growers lost as high as 75% of their plants.

May was cold, wet and dull, and little work could be done except on well drained, light, sandy soil. On May 11, 6 in. of snow accompanied by rain soaked the fields. Further frequent rains during the month resulted in the greatest precipitation, 8.61 in., for May in the thirty-two years that records have been kept. Orchard spraying was conducted under the most unfavourable conditions and much apple scab and russeting occurred as a result.

June was cool with almost 5 in. of rain. Sunshine totalled only 150 hours, 54 hours below the thirty-two year average. At the end of the month many fields were still too wet to work. Bright, windy, weather during July rapidly dried out the soil. Considering the late seeding, most crops developed well and looked promising by the end of the month. August was hot, dry and sunny with less than 1 in. of rain. Grain crops matured rapidly and potatoes and root crops suffered severely from drought.

The weather during late August and early September was excellent for harvesting. Late September was wet and cloudy. Late blight of potatoes began to develop in epidemic proportions about Sept. 14, but a frost on Sept. 18 killed the potato tops. Over 5½ in. of rain fell in October. However, the

potato and root crops were harvested in a clean condition except on very heavy land. Light snowfalls occurred on and after Nov. 15. The ground froze for the winter on Nov. 16 and the St. John River froze over Nov. 26. Light scattered snowfalls and rainstorms occurred during December. The weather was quite mild and the year closed with little snow and ice on the fields . . . (J.L. Howatt).

Growth of vegetation was encouraged in N.S. early in April, approximately two to three weeks ahead of average. On April 16 and again on May 3 the thermometer dropped to 19°F. in many sections of the apple-growing area. Severe blossom bud injury occurred. It has been estimated that at least 50% of the apple blossom buds were killed by these frosts. During May and June a total of 14 inches precipitation was recorded. For a period of ten days during full bloom the thermometer did not reach 60°F. Bee activity was practically nil and hence pollination did not take place. Apple crops were obtained on trees that reached full bloom before the cool spell, as well as on the late blooming varieties, but very few apples set on main crop trees. July, August and September were comparatively dry and drought conditions prevailed on the lighter soils. Bitter pit of apples was very prevalent (J.F. Hockey).

Winter conditions in P.E.I. were favourable for tree fruits, small fruits, and field crops. The snow cover was abundant and there was little frost in the ground. There was not sufficient ice formation on trees and bushes at any time to cause wood injury. Unusually warm, clear weather from early to mid-April gave promise of excellent growing conditions, but subsequent cold, wet weather retarded growth and halted farm work. Orchard and small fruit development was delayed at least two weeks. Spring frosts caused some injury to strawberries and blueberries.

Initial fruit sprays were applied during the first week of May. Later applications were delayed well beyond the regular schedule, flotation sulphur being used generally. By mid-June spraying of commercial orchards had become general, there being good evidence of satisfactory disease control at that time. Apple scab spore discharge was first noted June 18. Infection was seen on July 2 and by late July scab was general in unsprayed orchards and was causing some concern in the Charlottetown area, although only 1.51 in. of rain fell during the month. Control measures later turned out to be quite effective.

Late blight of potatoes became active during early July, inoculum having been supplied from cull piles of tubers. With prolonged dry weather in August and early September, late blight did not become serious. Wet weather during late September, however, brought on sufficient blight to promote considerable losses by tuber rot in storage. Killing frosts first occurred on Sept. 30, but not before late blight became general in many poorly sprayed fields. Cold weather during October made digging difficult, and some low temperature injury to potatoes was reported.

Blossom-end rot of tomatoes was unusually destructive in 1945 due to the marked irregularity of moisture supply. The "potato sickness" disease, a magnesium deficiency disorder aggravated by dry hot weather, caused severe injury in many potato fields during July (R.R. Hurst, L.C. Callbeck).

Phenological Data - 1945

The data in the following table were compiled by M.W. Cormack at Edmonton, R.C. Russell at Saskatoon, and B. Peturson at Winnipeg.

In the first column under each place is shown the date of blooming in 1945, and the second column indicates the departure from average in days. In most cases the average date of flowering is based on from 8 to 10 years' records.

Apparently the season was from ten days to two weeks late at all three places during the spring. Later on the vegetation caught up at all three places to some extent but most noticeably at Edmonton. Comparatively early seeding at Saskatoon did not materially hasten the emergence and heading of wheat (R.C. Russell).

Anthesis dates at Ottawa, with number of days departure from normal, for 9 plants from the main list were as follows:

Populus tremuloides	29/3 20E	Anemone canadensis	8/6 5L
Acer Negundo	9/4 18E	Bromus inermis	19/6 1L
Viola canadensis	13/4 18E	Phleum pratense	27/6 3L
Prunus pennsylvanica	2/5 8E	Solidago canadensis	30/7 5L
Smilacina stellata	20/5 2L		

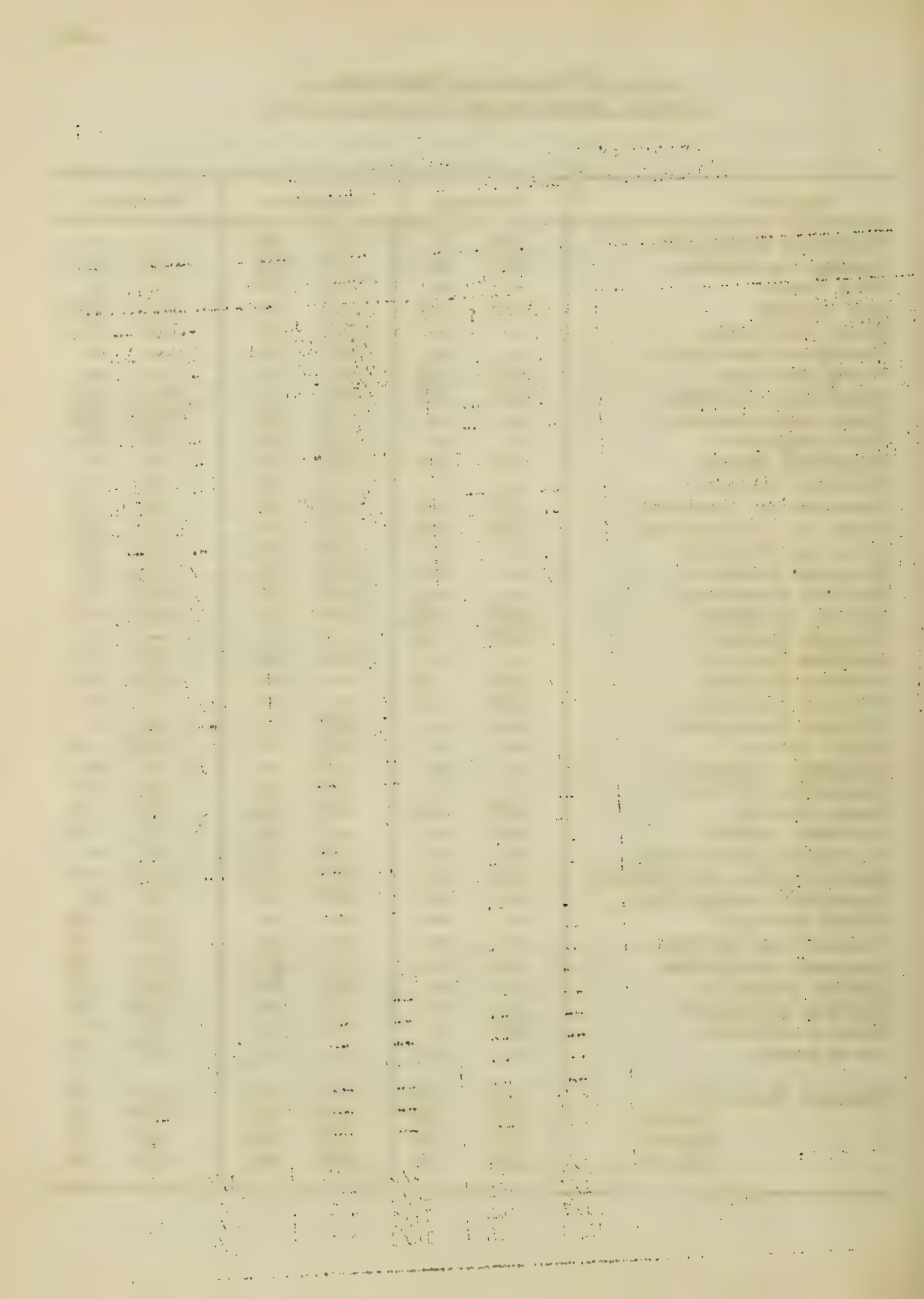
Anthesis dates of trees at Ottawa compared with previous years:

	10-yr. Average	1943	1944	1945
Acer saccharinum	14/4	23/4	17/4	25/3
Ulmus americana	27/4	7/5	30/4	3/4
Acer saccharum	8/5	19/5	6/5	14/4
Pinus sylvestris	27/5	2/6	24/5	27/5

The flowering season at Ottawa opened in late March about 20 days ahead of average. During the next 3 weeks, with mild weather prevailing, this gain was increased slightly until in mid-April the season was approximately 24 days ahead. At this point cold, wet weather set in and development was negligable for prolonged periods. Consequently the season was approaching the average in mid-May and was 5 or 6 days behind average at the end of May. A lag of several days persisted through June and July (W.H. Minshall).

Summary of Phenological Data Taken at
Winnipeg, Saskatoon and Edmonton, in 1945

Species	Winnipeg		Saskatoon		Edmonton	
Pulsatilla Ludoviciana	4/4	?	8/4	8E	--	--
Populus tremuloides	29/4	3L	8/4	15E	3/5	10L
Phlox Hoodii	--	--	10/5	12L	--	--
Acer Negundo	18/5	11L	20/5	14L	12/5	11L
Betula papyrifera	--	--	25/5	15L	18/5	10L
Thermopsis rhombifolia	--	--	25/5	15L	--	--
Prunus americana	25/5	11L	--	--	--	--
Amelanchier alnifolia	31/5	14L	27/5	13L	27/5	13L
Prunus pennsylvanica	--	--	4/6	15L	29/5	13L
Viola canadensis	--	--	27/5	10L	1/6	13L
Heirochloe odorata	2/6	12L	28/5	11L	--	--
Smilacina stellata	--	--	3/6	10L	6/6	12L
Crataegus sp. (hawthorn)	8/6	14L	11/6	14L	6/6	7L
Prunus sp. (chokecherry)	11/6	15L	6/6	10L	7/6	13L
Svida sp. (dogwood)	--	--	10/6	12L	12/6	12L
Elaeagnus commutata	--	--	18/6	16L	18/6	15L
Lonicera glaucescens	--	--	19/6	12L	20/6	11L
Anemone canadensis	15/6	8L	20/6	11L	26/6	9L
Viburnum Lentago	17/6	13L	--	--	--	--
Achillea lanulosa	--	--	20/6	10L	6/7	11L
Viburnum trilobum	19/6	8L	--	--	17/6	18L
Viburnum pubescens	21/6	13L	--	--	--	--
Diholcos bisulcatus	--	--	22/6	12L	--	--
Galium boreale	--	--	22/6	9L	22/6	6L
Campanula petiolata	--	--	1/7	--	--	--
Gaillardia aristata	--	--	1/7	--	--	--
Bromus inermis	2/7	10L	4/7	9L	5/7	9L
Agrimonia striata	--	--	--	--	8/7	8L
Chrysopsis hirsutissima	--	--	5/7	5L	--	--
Symphoricarpos occidentalis	--	--	12/7	5L	10/7	7L
Psoralidium argophyllum	--	--	19/7	10L	--	--
Phleum pratense	--	--	--	--	15/7	9L
Chamaenerion spicatum	--	--	--	--	16/7	7L
Agastache anethiodora	--	--	--	--	18/7	6L
Lactuca pulchella	--	--	20/7	10L	20/7	6L
Solidago canadensis	--	--	--	--	25/7	7L
Cirsium undulatum	20/7	?	--	--	--	--
Aster laevis	--	--	--	--	4/8	4L
Thatcher wheat: Sown	5/5	10L	1/5	4L	1/5	5L
Emerged	21/5	16L	20/5	11L	14/5	6L
Headed	11/7	14L	11/7	13L	8/7	7L
Harvested	11/8	8L	16/8	10L	17/8	3L



I. DISEASES OF CEREAL CROPS

WHEAT

ERGOT (Claviceps purpurea). A trace was found in the winter wheat plots at Lacombe, Alta. (M.W.C.). A heavy infection was reported in a field of Thatcher at Bredenbury, Sask., by Mr. Chisholm, United Grain Growers Co.; it was particularly heavy in the headland bordering the road allowance (A.M. Brown). It was also present in a seed sample from Carlyle (H.W.M.).

POWDERY MILDEW (Erysiphe graminis). Infection was light to moderate in the plots at Lethbridge, Alta., and a trace at Lacombe. A moderate infection was seen in one field and a trace in two others in seedling stands of winter wheat in southern Alta. in late October (W.C. Broadfoot). Infection was also severe on winter wheat about Guelph, Ont. (J.D. MacLachlan). The disease was slight to very heavy in spots on Rideau and Dawson's Golden Chaff winter wheat in the Cereal Division plots, C.E.F., Ottawa (R.G. Atkinson). Powdery mildew occurred sporadically across Canada; infection was heavy at Smithers, B.C., and Lethbridge, Alta., and moderate at Ottawa (T. Johnson, B. Peturson and W.J. Cherewick).

HEAD BLIGHT (chiefly Fusarium spp.). At Gretna, Man., 10% of the heads were reported to have been affected in 3 fields of wheat (Regent and Thatcher) by W.G. Sallans. The odd head was also infected in 3 of the Laboratory plots at Winnipeg. Fusarium graminearum was isolated from heads from both places. A trace was present in a Regent sample from Guelph, Ont. - F. avenaceum isolated; scattered heads in Regent from Lower South River, N.S. - F. Poae and Helminthosporium sativum isolated (W.L. Gordon). Up to 10% of the heads were affected in fields in Essex Co., Ont.; F. graminearum was isolated (J.J. Miller). Head blight was slight in the O.A.C. fields, Guelph (J.D. MacLachlan). Head blight caused an average infection of 10% of the heads in the plots at Ste. Anne de la Pocatiere, Que., and varied from 0 to 35%. Part of the blighting appeared to be due to root rot rather than direct infection of the heads (A. Payette). A few affected heads were brought to the Laboratory, Charlottetown, P.E.I. (R.R. Hurst).

SPOT BLOTCH (Helminthosporium sativum), resembling that found on barley, was a trace to moderate in the plots at Olds, Alta., and a trace in a field at Okotoks (W.C. Broadfoot).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.) caused slight damage in 16 fields and a trace in 11 out of 44 examined in Alta. In seedling stands of winter wheat in southern Alta. in late October, root rot damage was a trace in 3 fields, slight in 3 and moderate in 4 (W.C. Broadfoot).

Common root rot was recorded for 187 fields of wheat examined after Aug. 3 in Sask. Disease ratings varied from 2 to 26 on a scale where 40 is maximum. The mean rating of 9.3 with a standard deviation of 4.3 was about equal to the ratings in 1943 and 1941 and somewhat higher than those in 1944 and 1942 (P.D.S. 23:2 and 24:2). In general, the disease was more prevalent in crop districts where the rainfall was light and the crops poor. The first

provincial estimates of yields in bu. per acre for crop districts 1 to 9 were respectively: 22.1, 14.5, 6.1, 3.8, 23.1, 11.8, 7.8, 24.8, and 13.3; while the corresponding common root rot ratings were: 5.66, 6.79, 11.17, 13.36, 6.60, 9.95, 9.59, 8.60, and 10.46.

Traces of prematurity blight were present in 3 fields and a patch was found in one field at Delisle, Sask. (B.J. Sallans).

A basal stem rot (Fusarium culmorum) was severe on Carleton durum wheat in a zone about saline spots in the University plots, Saskatoon, Sask. The pH of the saline spots, where no wheat grew was 8+, but the pH of the root rot infected areas and the normal areas was the same, viz. pH 6.6. Possibly the salt balance in the root rot areas favoured the disease. When seed from this field was surface sterilized and plated on P.D.A., 9% of the seed yielded Fusarium (T.C. Vanterpool).

Much of the wheat was subjected in the seedling stage to strong winds in May and early June in Sask. The winds with drifting sand particles caused damage in some areas. The presence of common root rot caused additional complications and caused the seedlings to have a noticeably unthrifty appearance (T.C. Vanterpool).

Common root rot was found attacking the adult plants in most parts of Man. in 1945, but it was not serious except in a few individual fields of wheat and barley in the southwestern part. Durum wheat was severely attacked in certain experimental plots at Winnipeg, Morden, and Brandon. In these plots from 5 to 10% of the plants produced little grain. Seedling blight, the early phase of common root rot, was very severe in several fields in the lower Red River Valley. In individual fields at Dominion City and Steinbach, more than 25% of the seedlings were blighted, and as a result, the stand was very thin in the spring and the fields suffered from excessive growth of weeds later in the season (F.J. Greaney).

TAKE ALL (Ophiobolus graminis) caused slight damage in 4 fields and a trace in 3 out of 44 examined in Alta. (M.W.C.). Scattered plants were found affected in widely separate points in Sask. viz. Fox Valley and Melville. The disease was reported to be common and in some fields severe in northeastern Sask.; typical take all specimens accompanied the reports (R.C. Russell). Take all appeared to be causing slight damage in a field at Smeaton (T.C. Vanterpool). A severe outbreak of take all occurred in a field of wheat on newly broken land near Gilbert Plains, Man. In many large patches in the field, at least 50% of the plants were destroyed by the disease. This is probably the most destructive outbreak of take all on record for Man. (F.J. Greaney).

Take all was observed in localized areas in several fields of winter wheat in the Guelph district, Ont. In one field near Paris, the disease was severe throughout the field. From the number of samples received for examination, it would appear that the disease was increasing (J.D. MacLachlan). Take all was observed in the variety plots at the Station, Ste. Anne de la Pocatiere, Que. It was later found in 2 fields

at the Station, one of Coronation and another, half in Coronation and half in Regent. In the plots up to 5% of the plants were affected (A. Payette). The identification of the causal organism was verified (I.L. Conners).

STRIPE RUST (Puccinia glumarum) was general and heavy and caused slight to moderate damage at Creston, B.C. Kharkov seemed the worst affected (W.R. Foster). Infection was moderate on fall-sown Fairfield and Dawson's Golden Chaff, and a trace to nil on other named varieties at Agassiz, B.C.; a slight infection was present at the University, Vancouver (W. Jones). Infection was a trace in 5 fields, slight in 3, and heavy in 1 on seedling stands of winter wheat in southern Alta. (W.C. Broadfoot).

STEM RUST (Puccinia graminis) did not appear until late in the season in Alta. and was very scarce. A trace of infection was found at Lacombe on Aug. 24 and at Lethbridge on Sept. 10 (M.W.C.). Traces were recorded in only 4 out of 196 fields examined in Sask.; the virtual absence was due to the very dry conditions prevailing in the western half of Sask. in 1945 and the predominance of resistant varieties elsewhere (H.W.M.).

Stem rust infections averaging upwards of 50% developed on Marquis and Red Bobs in experimental plots at Morden, Winnipeg, Portage la Prairie, Brandon and Gilbert Plains, Man., in 1945. At these Stations the commonly grown stem rust resistant varieties Regent, Renown and Thatcher remained almost stem-rust free throughout the season. Virtually no stem rust occurred in commercial fields of these varieties and, since nearly all the wheat acreage in Man. was sown to stem rust resistant varieties, this rust caused no reduction in wheat yields. A very light infection of stem rust was present on barley varieties throughout Man. In most fields examined this infection averaged only 1 or 2% or less and had only a very minor effect on yields (B. Peturson). Stem rust only slightly affected winter wheat in the Guelph area, Ont., because it did not appear until the grain was nearing maturity (J.D. MacLachlan). Stem rust was almost absent from the plots at Fredericton, N.B., 10% being recorded on Huron (S.F. Clarkson). Infection varied from 5 to 40% in 10 fields examined in Queens and Prince Counties, P.E.I., in late August (R.R. Hurst). A 10% infection was recorded on Garnet in a field in Kings Co. (E.B. McLaren).

An examination of rust nursery material (q.v.) grown at 30 separate points in Canada revealed an infection of 20% or more on the more susceptible varieties at Indian Head, Sask., Brandon and Morden, Man., Fort William and Guelph, Ont., and Normandin, Que. (T. Johnson et al.).

LEAF RUST (Puccinia triticina) infection was moderate on fall sown Garnet and Thatcher, slight on Rideau, Cornell 595, Nured, Dawson's Golden Chaff and Marquis and a trace on Fairfield at Agassiz, B.C., in June; it was severe on spring sown Garnet and Red Bobs, moderate on Thatcher and a trace to slight on Marquis and Coronation in August. A slight infection was also recorded on all varieties at Saanichton (W. Jones).

Leaf rust did not appear until late August in Alta., when a trace to slight infection was observed at Lethbridge, Olds, Lacombe and Edmonton. A moderate to severe infection developed in September in a few late-maturing stands at Edmonton and in the soft wheat varieties at Lethbridge (M.W.C.). Leaf rust was widespread in Sask.; it was severe in many fields in the eastern part, where rainfall was normal, but was scarce or absent in the dry western section (H.W.M.).

Leaf rust of wheat was very late in getting established in Man. in 1945. It was not until the first week in July, three weeks later than normal, that the first leaf rust infections were observed. However, owing to a cold late spring, crops were also late, generally a good two weeks later than normal. Although the initial infections were late, they were quite heavy and widespread. They evidently were due to heavy leaf rust spore-showers that occurred over Man. during the week centering on June 20. Leaf rust infections spread and developed rather quickly and by the end of the first week in August (shortly before harvest) infections on Thatcher wheat averaged well over 70% in most fields and in some fields they averaged as high as 90%. Regent and Renown also became heavily infected with leaf rust. Although not quite as severely rusted as Thatcher, Regent and Renown in most localities in Man. carried infections averaging over 60%. In general, Regent and Renown became much more heavily infected this year than formerly. Recent greenhouse studies indicate that the heavier infections which developed in these varieties this year were due to an increase in the prevalence of races of leaf rust to which they are susceptible (B. Peturson). A moderate infection occurred at Guelph, Ont. (J.D. MacLachlan). A trace of leaf rust was first noticed on Dawson's Golden Chaff in the Cereal Division plots, C.E.F., Ottawa, on June 13. Infection was up to 65% on the same variety and 25-40% on Rideau on July 20. Next day leaf rust infection was up to 40% in a 2-acre block of Thatcher, 5-10% on a similar block of Coronation and 25-40% on 2 small blocks of Garnet. In the rust nursery, Kapuskasing, infection was virtually 100% on Little Club, 65% on Regent and generally heavy on all varieties (R.G. Atkinson). Leaf rust infection varied from a trace to 80% in the plots at Ste. Anne de la Pocatiere, Que.; it was again fairly heavy on Coronation and Regent which were said to have been relatively free from rust when the varieties were first introduced (A. Payette). Leaf rust infection varied from 20-85% on the more susceptible varieties at Fredericton, N.B. (S.F. Clarkson). Infection varied from 5 to 65% in Queens Co., P.E.I., on Aug. 30 (R.R. Hurst).

Leaf rust of wheat was generally severe except in Alta., western Sask., and some parts of the Maritime Provinces. In Man. and Sask. and in certain areas in eastern Canada, wheats such as Regent that had been resistant in previous years, showed considerable susceptibility. The reason appears to lie chiefly in the prevalence, in 1945, of physiologic races, such as race 128, that may attack these varieties heavily (T. Johnson et al.).

BROWNING ROOT ROT (Pythium spp.) was not conspicuous this year in Sask. probably due to the prolonged cool weather of early summer and perhaps to some extent to the increased use of phosphate fertilizer.

Isolations were made from only one sample from which Pythium tardicrescens was obtained. This species has previously been reported (P.D.S. 18:8) to be more commonly associated with browning root rot in cool years than P. arrhenomanes and P. aristosporum, the other virulent species. P. aristosporum was associated with wireworm damage of crested wheat grass in July. During the June survey, fields showing moderate damage were observed around Prince and Revenue, and slight damage at Humboldt. On the University Seed Farm the most of one field and one corner of another were severely attacked, both leaf yellowing and root lesioning being conspicuous. Some barley fields showed typical leaf symptoms, but root lesioning was inconspicuous on this crop.

During the war years the amount of phosphate fertilizer available in Sask. was on a quota basis. The amount was almost the same during the years 1940 to 1943 inclusive, with a slight increase in 1944, and about four times as much in 1945. The following results are based on the amount of phosphate fertilizer sold in Pythium root rot areas, the average rate of application, and the average increase in yields as obtained from field experiments in Pythium root rot areas.

Savings in the control of Pythium root rot through the use of phosphate fertilizer were as follows:

1940 to 1943	$4,000,000
1944	1,250,000
1945	3,500,000

On the Regina plains where the annual saving during the first five years under review was less than a quarter of a million dollars, it is estimated that at least 1½ million dollars could have been gained annually if an adequate supply of phosphate had been available.

The fact that $3,500,000 is estimated to have been saved in 1945, a year in which Pythium root rot was less severe than usual but one in which phosphate was more widely used, gives some idea of the losses incurred in previous years when the root rot was more severe and insufficient amounts of phosphate were available.

In trials concluded June 16, 1945, to determine the parasitic action of Pythium tardicrescens and P. ultimum to wheat, P. tardicrescens was found to be moderately parasitic, causing root browning and necrosis, whereas P. ultimum was mildly parasitic, causing root stunting with browning confined to the extreme tip (T. C. Vanterpool).

Browning root rot was found in a few fields in the Gilbert Plains district, Man. It was associated with soil deficient in phosphate (F.J. Greaney).

GLUME BLOTCH (Septoria nodorum). A slight infection was recorded in 2 fields and a trace in another out of 44 examined in Alta. (M.W.C.). A light infection was found in Sask. in 3 fields out of 196 examined; they were located in areas where moisture was ample (H.W.M.). A few affected heads were observed in one field near Hunter River, P.E.I. (R.R. Hurst).

SPECKLED LEAF BLOTCH (Septoria spp.). Infection was a trace in 8 fields, slight in 18 and moderate in 1 out of 44 examined in Alta. Infection was slight to moderate in the plots at Lethbridge, slight at Lacombe, and a trace to slight at Olds (M.W.C.). Speckled leaf blotch was present in 4 fields in the northeastern and eastern areas in Sask., where moisture was abundant. Leaf spots of undetermined origin were reported in 20 fields (H.W.M.).

The strain of Septoria with spores larger than S. nodorum Berk. and closely resembling S. Avenae Frank, which was first reported in 1942, was generally prevalent on wheat in Man. in 1945. Lesions were first found on July 12 and infection was widely distributed through the province before the end of the month. After the first week in August lesions bearing pycnidia were common in all wheat fields examined, particularly on older leaves. The abundance of pycnidia on fading leaves suggested that the death of the leaves was hastened by the infection. Trace infections by the same organism were found on spring rye at Winnipeg and on barley and oats in a few localities. Infection tests in the greenhouse indicated that the organism on rye, oats, and barley was pathogenically (as well as morphologically) identical with that on wheat. Slight to moderate infections were noted on wheat from some of the rust nurseries (q.v.) in Ont. and Que. (T. Johnson).

Speckled leaf blotch (Septoria Tritici) was slight to moderate on Rideau, Garnet, Marquis, Dawson's Golden Chaff, and Jones' Fife at Agassiz and the University, Vancouver, B.C. (W. Jones).

BUNT (Tilletia caries and T. foetida). A summary of car inspections for the first quarter of the grain year 1945-46 was prepared by W. Popp from the records of the Western Inspection Division. The results are given in Table 1.

Table 1. Wheat Bunt in Western Canada

Summary of Inspections from August 1 to October 31, 1945

Class of Wheat	Cars Inspected	Cars Graded Smutty	Percentage Graded Smutty
Hard Red Spring	65,829	162	0.25
Amber Durum	1,183	33	2.79
White Spring	19	0	0.00
Alberta Red Winter	249	6	2.41
Garnet	367	0	0.00
Mixed Wheat	37	0	0.00
All Classes	67,684	201	0.29

There appears to be very little change in the bunt situation in wheat in Western Canada in 1945 as a comparison with the figures for the same quarter in 1944, or earlier, will show.

In the field, a trace of bunt was seen in 2 fields out of 44 examined in Alta. (M.W.C.). The field survey revealed considerable bunt in certain districts in the southwestern part of Sask., infection varying from a trace to 13% of the heads, but very little bunt was seen elsewhere. Out of 30 samples of wheat examined in the laboratory 22 were clean and 4 others carried such a light spore load that treatment was not recommended.

In field plot tests conducted by the Laboratory with a large number of naturally smutted samples of wheat, oats and barley, less bunt developed in 1945 than in the previous year, but considerably more covered smut appeared in the oats and barley. There was a good correlation between the spore load on the seed and the amount of smut in the subsequent crop (R.C. Russell). A single head of Dawson's Golden Chaff sent by S.A. Bowman from a farm at Perth, Ont., was affected by T. caries (I.L. Conners).

LOOSE SMUT (Ustilago Tritici) affected 3% of the heads in a field of durum wheat at Findlay, Man. (J.E. Machacek). From enquiries regarding the control of loose smut, it would appear that the disease was unusually prevalent in winter wheat in 1945 in southwestern Ont.; and some fields were "rather badly infected". Its increased prevalence is thought to be due to the rainy weather at flowering time in 1944 (P.D.S. 24:xii) (I.L. Conners). Loose smut infection was moderate to severe on winter wheat about Guelph, Ont.; more prevalent than in 1944 (J.D. MacLachlan). A trace was present in Coronation and Huron in the plots at Ste. Anne de la Pocatiere, Que. (A. Payette). A trace was recorded in one field near Charlottetown, P.E.I. (R.R. Hurst).

BLACK CHAFF (Xanthomonas translucens var.) caused slight damage in the University plots, Saskatoon, Sask., on Carleton durum wheat; dried bacterial ooze was showing on the stems (T.C. Vanterpool). Bacterial black chaff (X. translucens f. sp. undulosa) infection ranged from a trace to 45% in 7 out of 28 fields examined in Man. (W.A.F. Hagborg).

BROWN NECROSIS (cause unknown) was prevalent on many of the new varieties at Brandon, Man. It was confined to the outer glumes; no neck or stem browning was present (F.J. Greaney).

HEAT INJURY. The green leaves of wheat at Dauphin, Man., showed 2 yellow bands each on June 30, as a result of the extreme heat at the soil level during June 19 and 20 respectively (J.E. Machacek).

OATS

ANTHRACNOSE (Colletotrichum graminicola). Injury from anthracnose was conspicuous on the lower leaves in an area from Saskatoon, Sask., west for about 20 miles on Aug. 22. Slight damage was also noted on barley at Nipawin on Sept. 15. The disease appears to be on the increase in Sask. (T.C. Vanterpool).

POWDERY MILDEW (Erysiphe graminis) was slight on all varieties at Saanichton, B.C. (W. Jones). In the rust nurseries (q.v.). a trace was present at Saanichton and Smithers, B.C. (T. Johnson et al.).

COMMON ROOT ROT (Fusarium spp.) moderately affected all of the 14 fields examined in Sask. (B.J. Sallans).

LEAF BLOTCH (Helminthosporium Avenae) infection was slight on a few varieties at Agassiz, B.C. (W. Jones). Infection was a trace in 3 fields, slight in 13, moderate in 1 out of 21 examined in Alta.; it was a trace to moderate on the varieties at Lethbridge and slight at Lacombe (M.W.C.). The disease was moderate about Guelph, Ont. (J.D. MacLachlan). Leaf blotch was most conspicuous in the Montreal district, Que., in July when infection was recorded as slight in 38 fields and moderate in 19 out of 62 examined; an extended tour embracing Sherbrooke, Riviere du Loup and Lake St. John revealed infection slight in 10 fields, moderate in 16 and severe in 2 out of 47 examined (T. Simard). Infection varied from a trace to 35% on varieties in the various tests at the Station, Fredericton, N.B. (S.F. Clarkson). Leaf blotch was general in the East Baltic area of Kings Co., P.E.I.; damage was slight to severe (R.R. Hurst).

HALO BLIGHT (Pseudomonas coronafaciens). Infection was a trace to slight on a few varieties at Edmonton and Olds, Alta. (W.C. Broadfoot). A heavy infection was noted on the lower leaves in a field at Aberdeen, Sask. (T.C. Vanterpool). A light infection was found in 9 fields out of 23 examined in Man. (W.A.F. Hagborg). Halo blight was heavy on some volunteer oats in a strawberry planting in Queens Co., P.E.I.; it was noted on several other occasions in 1945 (R.R. Hurst).

CROWN RUST (Puccinia coronata) was again prevalent throughout Sask., but it developed very little in the western areas due to the dry weather (H.W.M.). Crown rust of oats was prevalent throughout Man. in 1945. Late sown susceptible varieties became very heavily infected. In the earliest sown crops only light infections occurred, but in crops that did not ripen until late August (and owing to a late spring there was a considerable percentage of these late fields) infections averaged well above 75% on such varieties as Victory, Banner, Gopher, Vanguard, and Exeter. These heavily infected crops suffered severe damage. The variety Ajax, which has considerable mature plant resistance to certain races of crown rust, was much less severely affected. This variety, even in late fields, rarely carried infections in excess of 25% and in most the infection was considerably less (B. Peturson). Infection was moderate to severe around Guelph, Ont. (J.D. MacLachlan).

Crown rust was again epidemic in eastern Ont. in 1945, after an interval of 8 years. Although the season opened early, fine weather was followed by a long cold rainy period. A few fields were thus sown earlier than in most seasons, but the bulk of the crop was sown unusually late. On July 31 a survey was made between Ottawa and Pakenham, some 30 miles up the Ottawa Valley. Only 10-20% infection was present in a few early-sown fields, but it varied from 40 to 80% in the later fields. The trip in part was through a well known buckthorn area. The percentage of rust on the crop appeared in general to be correlated with the proximity of the alternate host, maturity of crop, site, and variety. While the level of infection in individual fields might be very uniform, it was evident that the nearer the bushes were to the crop, the greater the depressing effect on height of straw and size of panicle. While crown rust was severe locally in the Ottawa Valley, it was reported to have caused equally severe losses in the counties fronting on the St. Lawrence. In these counties, where Erban had gained favour on account of its resistance to the prevailing races, it was as severely rusted as any of the susceptible varieties. Of the varieties extensively tested in 1945, only 601 was lightly attacked by crown rust. Beaver, from a cross between Erban and Vanguard, was heavily rusted. The poor showing of Erban, or of varieties possessing Erban resistance, in 1945 in contrast to 1937, is almost certainly due to predominance of races of Puccinia coronata, to which these varieties are highly susceptible. Some preliminary work has already been done in eastern Ont. by the District Weed Inspector of the Crops, Seeds and Weeds Branch, Ont. Department of Agriculture, on the eradication of buckthorn in a campaign against the alternate host (I.L. Conners). On July 21, infection varied from 5 to 25% in a block of Ajax in the Cereal Division fields, Ottawa, while no rust was observed in a 3-acre block of Beaver (R.G. Atkinson). Crown rust was light on oats about Quebec, Que. (O. Caron). A slight infection was observed in the Montreal district in June in 2 fields out of 109 examined; in one field the rust was spreading from a nearby buckthorn hedge. Rust increased in severity, the infection in August being severe in 19 fields, moderate in 31 and slight in 2 out of 53 examined. In the other areas visited infection was severe in 14, moderate in 19 and slight in 11 out of 47 examined (T. Simard). Crown rust infection varied from a trace (Roxton) to 75% (Cartier) in the Quebec Seed Board tests at Ste. Anne de la Pocatiere, Que.; similar percentages occurred in the other oat plots (A. Payette).

Crown rust was heavy on 3 varieties sown adjacent to buckthorn bushes at Fredericton, N.B., on June 13; infections recorded on Aug. 17 were 90% on Erban, 98% on Victory and 35% on Mabel. In another test the same varieties were sown at Springhill in ¼ acre plots on July 1; Erban and Victory failed to head due to severe crown rust infection, while Mabel headed out and set seed. In the variety plots at Fredericton infection was not over 30% except on some late varieties (S.F. Clarkson).

Crown rust of oats occurred sparingly in eastern Sask., was very prevalent in Man., and appeared in epidemic form in many localities in Ont., Que., and the Maritime Provinces. In Eastern Canada there was a decrease in the proportionate prevalence of races 2 and 3 and an increase in prevalence or races 4 and 5. The extensive damage caused in Eastern Canada to Erban and other oat varieties possessing a similar type of resistance was, no doubt, due to increased prevalence of races 4 and 5, both of which attack these varieties heavily at all stages of growth (T. Johnson et al.).

STEM RUST (Puccinia graminis). A slight infection was observed on July 20 in several fields at Ladner, B.C. (W. Jones). Stem rust was first observed in Alta. on Aug. 24 as a heavy primary infection in the plots at Lacombe. Infection was slight to moderate in late maturing stands at Edmonton (M.W.C.). Stem rust caused slight to moderate damage in 4 fields out of 34 examined in Sask.; it was mostly confined to the eastern part of the province, but it was present in late crops around Saskatoon (H.W.M.). A heavy infection was noted at Vonda and Prince Albert on Sept. 14-15 (T.C. Vanterpool).

Stem rust of oats was first observed in Man. in 1945 as trace infections on oat crops in the southern part of the province during the third week in July. The infection increased rapidly and by mid-August susceptible varieties in some fields carried infections averaging 60% or more. Some of the new stem rust resistant varieties became quite heavily infected and in late fields, which matured toward the end of August, were severely damaged. Of the resistant varieties, Vanguard and Exeter were the least affected and infections on them rarely averaged over 10%, even in late fields. Ajax generally became more heavily infected and, although early sown fields of this variety carried only trace infections, many later ones carried infections averaging upward of 50%. The variety Tama, a stem-rust resistant variety of American origin, although not grown in Man. on a commercial scale, was included in experimental tests in several localities in the province. The late sown plots of this variety became heavily infected with stem rust. As in the previous two years the field infections of these resistant varieties were caused by physiologic races 8, 10, and 11 of Puccinia graminis var. Avenae. A marked further increase in these formerly rare races occurred this year and they have become so prevalent and widespread in Canada that they now constitute a threat to all the new resistant varieties which have been distributed to growers in recent years. A number of new strains of oats, which are resistant to races 8, 10 and 11, remained practically rust free throughout the season in test plots located at several different Stations (B. Peturson).

Stem rust was severe at scattered points in eastern Ont. in 1945. Observations made this year only confirm those made previously that when stem rust is present in epidemic proportions it is due to local outbreaks initiated by aeciospore inoculum from barberries nearly always occurring as escapes. From samples received from Pakenham and Appleton and fields examined at Vankleek Hill, it was evident that Vanguard or varieties possessing the same factors for resistance were being heavily rusted in 1945. A 50% infection was recorded in 2 fields of Beaver at Vankleek Hill on Aug. 7. From samples received from Pakenham, Ajax appeared to be somewhat more severely affected than Beaver. It should be noted that although 601 was remarkably resistant to the prevailing races of crown rust, it apparently possesses only the resistance of Vanguard to stem rust, and, in fact, a block of this variety was moderately rusted in the Cereal Division plots at Ottawa, according to R.A. Derick of that Division. Vanguard proved highly resistant to the races of stem rust prevailing in eastern Ont. and its introduction by the Cereal Division into areas where rust damage had been severe has in the meantime been of great practical benefit.

However, with the appearance of races of stem rust to which Vanguard is susceptible in 1943 in eastern Ont., the occurrence of rust in damaging amounts on Ajax, etc., during the past season is not surprising.

The severity of stem rust in 1945 focused attention on the importance of the barberry in initiating localized epidemics. At Appleton, near Carleton Place, a determined effort to eradicate the common barberry by spraying the bushes with sodium chlorate or Stephens Weed Killer was started on July 31. The original planting was thought to have been a few bushes set out in the village of Appleton some 30 years ago or more. Losses from stem rust are said to have become serious in the vicinity, and in 1930 as many of the escaped bushes as could be located were pulled up or cut down. The growers experienced relief from damage for two years, after which losses again began to increase. This area was located independently in 1932 (P.D.S. 12:2), when the bushes, which had been cut down two years previously were rapidly growing up again. The efforts to uproot the bushes were also not entirely successful. According to E.G. Anderson of this Division, the bushes sprayed in July 1945 appeared in most instances to be dead when he examined them on Oct. 6. Several other concentrations of bushes in this area still remain to be sprayed and a systematic survey for outlying bushes has yet to be undertaken. As mentioned under crown rust, a campaign to eradicate the alternate hosts in eastern Ont. is being organized (I.L. Conners).

Stem rust was not observed until July in the Montreal district, Que.; in August infection was slight in 9 fields, moderate in 1 and severe in 1 out of 53 examined. In the other areas visited infection was slight in 7 fields and moderate in 7 out of 47 examined (T. Simard). A trace of stem rust was observed on a few varieties in the plots at Ste. Anne de la Pocatiere (A. Payette). No stem rust was recorded on oats at Fredericton, N.B. (S.F. Clarkson). A moderate infection, mostly in the telial stage, was present on Erban at Briley's Brook, N.S., on Aug. 20 (J.F. Hockey).

Stem rust was rather severe in Man. and eastern Sask. and locally in certain other parts of the country. The previously resistant variety, Ajax, was heavily rusted in most of Man. and Sask., and the variety Vanguard bore more rust than in past years. The reason is to be found in the unusual prevalence of races 3, 10 and 11 in many parts of the country (T. Johnson et al.).

SPECKLED LEAF BLOTCH (Septoria Avenae). Infection was slight to moderate on a few varieties at Lethbridge, Alta. (M.W.G.). Infection was severe in a 20-acre field of Ajax at the Experimental Station, Kapuskasing, Ont. (R.G. Atkinson). Infection was slight in 10 fields and moderate in 3 out of 62 examined in July, in the Montreal district, Que.; in other districts, it was slight in 11 fields and moderate in 4 out of 47 examined in August (T. Simard). Speckled leaf blotch caused a 10-35% infection in the Quebec Seed Board plots at Ste. Anne de la Pocatiere; even a heavier infection occurred in the other oat plots. In contrast, only traces of Helminthosporium leaf blotch occurred in the same plots (A. Payette). Infection varied from a trace to 50% in the plots at Fredericton, N.B. (S.F. Clarkson). Traces of the disease were present in the rust nursery material (q.v.); the pathogen was not always S. Avenae (T. Johnson).

SMUTS (Loose Smut, Ustilago Avenae and Covered Smut, U. Kolleri). Loose smut was moderate on Lee and a trace to slight on several others at Saanichton, B.C. (W. Jones). A trace of smut was recorded in 10 fields and a slight infection in 5 others in Sask. Covered smut (highest infection 5%) affected 13 fields and traces of loose smut occurred in 2. All 5 seed samples examined were smutty (R.C. Russell). In 10 fields examined for smut in Man., loose smut (trace to 6%) occurred in 3 and covered smut (trace to 5%) in 5 (W.L. Gordon, W. Popp). Loose smut was slight to moderate about Guelph, Ont. (J.D. MacLachlan). Smut lightly affected oats about Quebec, Que. (O. Caron). Out of the 100 fields examined in Que. in August, infection by loose smut was slight in 6 fields, moderate in 7 and severe in 3; the corresponding figures for covered smut were: slight in 20 fields, moderate in 12 and severe in 6 (T. Simard). Infection ranged from a trace to 4% in fields examined in a survey of Kings, Annapolis and Lunenburg counties, N.S. (J.F. Hockey). A trace to 15% was present in 11 fields examined in the eastern part of Kings Co., P.E.I., on Aug. 9. (R.R. Hurst).

A specimen of the dock-leaved persicary, Polygonum lapathifolium, affected by smut (Ustilago utriculosa), was received from Mr. Adhemar Belzile, Superintendent at the Station, Normandin, Que., with this comment: "Persicary is a common weed in this district but this is the first time that it has been noticeably affected by smut". Smutted smartweed was noted on several occasions in oat fields during my cereal disease surveys in the Maritime Provinces in 1937 (P.D.S. 17:9) and in Quebec in 1939 (I.L. Conners).

BLAST (non-parasitic) was recorded as follows: moderate on Wintock, trace to slight on other varieties at the Station, Saanichton, B.C.; slight on Victory and Eagle in the University plots, Vancouver (W. Jones); trace in 10 fields, 5% in 5, 10% in 2 and 15-20% in 4 in the 21 fields examined in Alta.; 5-20% in the plots at Olds, trace-10% at Lethbridge and trace-5% at Lacombe (M.W.C.); present in most fields in Sask. causing slight damage (H.W.M.); 25% of plants severely affected in a field at Neelin, Man., blasted spikelets extending from the base to the tip of the panicles and many plants completely sterile (F.J. Greaney); out of 100 fields in Que. slight in 70, moderate in 19 and severe in 7 (T. Simard). Appreciable percentage of blast occurred in the oat variety plots at Ste. Anne de la Pocatiere (A. Payette); varied from 5 to 30% in the variety plots, Fredericton, N.B. (S.F. Clarkson); heavy in a field at Kensington, P.E.I., and traces in several other fields examined (R.R. Hurst).

Both frost and soil drifting caused severe damage to oats in the seedling stage during late April and early May in Sask. (H.W.M.).

GREY SPECK (deficiency of available manganese) was observed again in the Winnipeg and Gilbert Plains districts, from which it had been previously reported, but also from farmers' fields in the 4 new districts of Swan River, Etholbert, Erickson, and Oak Bank in Man. (W.A.F. Hagborg).

BARLEY

HEAD BLIGHT and DISCOLORATION (Alternaria, etc.). In field at Brandon, Man., 10% of the heads showed discoloured spikelets. Alternaria (most common) and Fusarium Equiseti were isolated (F.J. Greaney, W.L. Gordon). Head blight was slight in 24 fields, moderate in 9 and severe in 5 out of 48 examined in the Montreal district, Que. (T. Simard).

ERGOT (Claviceps purpurea). A trace was recorded in 2 fields and slight infection in one out of 32 examined in Alta.; a trace occurred in the plots at Lacombe and Lethbridge (M.W.C.). A trace of ergot was observed in a field at Kinistino, Sask., and in the plots at Saskatoon. Many sclerotia were present in a sample of seed from Carrot River (H.W.M.). Ergot occurred occasionally about Guelph, Ont. (J.D. MacLachlan). Ergot caused considerable damage in fields chiefly of smooth-awned barley in York Co., Ont. (J.E. Howitt). A trace was found in one field in the Montreal district, Que. (T. Simard), and in one variety in the plots at Fredericton, N.B. (S.F. Clarkson). A sample of ergot in barley was brought to the Laboratory, Charlottetown, P.E.I. (R.R. Hurst).

POWDERY MILDEW (Erysiphe graminis) was causing slight damage to Cape, Morocco and Chilian Brewing on March 29 in fall-sown test rows at Saanichton, B.C.; it was moderate on Newal and a trace to slight on others in spring barley at Agassiz (W. Jones). Powdery mildew was severe about Guelph, Ont.; it is still the most important barley disease in the district (J.D. MacLachlan). Infection was moderate to heavy in the Cereal Division plots on Galore at Manotick and heavy on Montcalm at Ottawa (R.G. Atkinson). Powdery mildew infection was slight in 7 fields, moderate in 4 and severe in 1 out of 27 examined in the Montreal district, Que., in August (T. Simard). The disease was moderate to severe in B.C., Ont. and southwestern Que. (T. Johnson et al.).

STRIPE (Helminthosporium gramineum) infected 1% of the plants in a plot at Brandon, Man. (B. Peturson).

SPOT BLOTCH (Helminthosporium sativum). Infection was slight in 2 fields, and a trace in 5 out of 32 examined in Alta.; it ranged from a trace to moderate on most varieties at Lethbridge and Olds, and was slight at Lacombe (M.W.C.). A slight infection was noted in a field at Jordan, Man. (J.E. Machacek). Spot blotch slightly affected barley about Guelph, Ont.; infection was chiefly on the basal leaves. In one field of Galore the disease was moderate to severe (J.D. MacLachlan). Spot blotch was slight in 12 fields out of 27 examined in the Montreal district, Que., in August (T. Simard).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Damage was a trace in 3 fields and slight in 2 in Alta. (M.W.C.). Out of 16 fields examined in Sask., the disease was moderate in 14 and severe in 2 (B.J. Sallans). Infection was moderate to severe in a barley field on barley stubble at Nipawin on Sept. 14 (T.C. Vanterpool).

NET BLOTCH (Helminthosporium teres). Infection was slight in one field in Alta., and a trace to slight on some varieties at Lacombe (M.W.C.).

Infection was a trace to slight in 5 fields in widely scattered areas of Sask. out of 17 examined (H.W.M.). Net blotch infection was recorded as a trace in 1 field, slight in 2 and moderate in 4 in Man. (W.L. Gordon). Net blotch was nil on 2 varieties, a trace on 13 and infection varied from 5-75% on the remaining 10 at Ste. Anne de la Pocatiere, Que. (A. Payette). Trace to 25% infections were recorded on most varieties under test at Fredericton, N.B. (S.F. Clarkson).

LEAF RUST (Puccinia anomala). A moderate infection was observed on Trebi and Peatland at the Agassiz Farm, B.C. (W. Jones). Leaf rust was not important in Sask. in 1945; a trace was present in 1 field out of 19 examined (H.W.M.). A light sprinkling of leaf rust was present on barley varieties throughout Man. In many of the fields examined only trace infections were observed; in others, infections averaged from 1 to 5%. However, in a number of fields of Plush, a variety very susceptible to leaf rust, infections averaged as high as 35% (B. Peturson).

Leaf rust was moderate about Guelph, Ont. (J.D. MacLachlan). A slight infection was found in 3 fields in the Montreal district, Que. in August (T. Simard). Leaf rust was usually a trace on most varieties at Ste. Anne de la Pocatiere, but 3 varieties showed readable percentages (A. Payette). Leaf rust was virtually absent in the plots at Fredericton, N.B. (S.F. Clarkson). In the rust nurseries (q.v.) moderate to severe infections occurred at Agassiz, B.C., Winnipeg, Man., Guelph, Ont., and Lennoxville and L'Assomption, Que. (T. Johnson et al.).

STEM RUST (Puccinia graminis). Light infections were observed in 2 fields in heavy crops in Sask.; it was also present in a late crop at Saskatoon (H.W.M.). Stem rust was moderate about Guelph, Ont. (J.D. MacLachlan). A trace was noted on Velvet at Rose Valley, P.E.I. (R.B. McLaren). A slight infection was found in only 2 fields in the Montreal district, Que. (T. Simard). Traces occurred on several varieties in the plots at Ste. Anne de la Pocatiere (A. Payette). In the rust nurseris (q.v.) stem rust was moderate at Normandin, Que., but elsewhere it was nil to slight (T. Johnson et al.).

BROWNING ROOT ROT (Pythium spp.). Affected plants from Hazelcliffe, Sask., were received from P.M. Simmonds (T.C. Vanterpool).

SCALD (Rhyncosporium Secalis) infection was severe on Peatland, moderate on Plush and slight on Trebi in the plots at Agassiz, B.C.; it was also slight to moderate in the fall-sown varieties at Saanichton (W. Jones). Infection was a trace in 9 fields, slight in 7, moderate in 3 out of 32 examined in Alta.; a trace to slight infection was present in the plots at Olds, Lacombe, and Edmonton (M.W.C.). A light infection was recorded at Kinistino, Sask., and a trace at Saskatoon (H.W.M.). Scald was reported to be severe on certain lines of barley at Tisdale and the material was checked microscopically. According to H. Friesen, Field Husbandry Dept., the scald did not appear to have affected the yields appreciably (T.C. Vanterpool).

SPECKLED LEAF BLOTCH (Septoria Passerinii). Infection was a trace in 4 fields and slight in 5 out of 32 examined in Alta.; it was slight to moderate in the plots at Lacombe and a trace to slight at Lethbridge (M.W.C.). A light infection was noted in 2 fields out of 19 examined in Sask. (H.W.M.).

Speckled leaf blotch of barley was more common in Man. than for several years. Light to moderately heavy infections were found in many localities throughout the southern part of the province in late July and early August. In the rust nurseries (q.v.) it was moderate to heavy in B.C., and at several places in Ont. and Que. (T. Johnson). A moderate infection occurred on O.A.C. 21 at the Station, Kapuskasing, Ont. (R.G. Atkinson).

LOOSE SMUT (Ustilago nuda) and FALSE LOOSE SMUT (U. nigra). Loose smut (U. nuda) affected 10% of heads of Newal with a trace on other varieties at Agassiz, B.C. (W. Jones). A trace of the loose smuts was recorded in 4 fields, slight infection in 4 and 8% in one in Alta.; infection in Newal was 5% at Olds and 2% at Lacombe and a trace occurred in several varieties at Lethbridge (M.W.C.). The loose smuts (chiefly U. nuda) were found in 6 fields out of 19 examined in Sask.; the highest infection being 5% (R.C. Russell). In Man., 12 fields were examined: U. nigra alone was present in collections from 3 fields (5-15%); U. nuda alone in 3 collections (10-20%); mostly U. nigra, but some U. nuda in 1 (22%): mostly U. nuda but some U. nigra in 1 (14%). Infections (tr.-3%) of "loose smut" were reported from 4 additional fields (W.L. Gordon, W. Popp). Loose smut affected 15% of the heads in a field of O.A.C. 21 at the Station, Kapuskasing, Ont. (R.G. Atkinson). Loose smut infection was slight in 6 fields and moderate in one out of 48 fields examined in the Montreal district, Que. (T. Simard). Traces were recorded on 7 varieties and 10% infection on Br. 1283 in the plots at Ste. Anne de la Pocatiere, Que. (A. Payette).

COVERED SMUT (Ustilago Hordei). Infection was a trace in 6 fields and slight in 2 out of 32 examined in Alta. (M.W.C.). A single field affected by covered smut was seen in Sask. All 9 samples examined of barley of the 1944 crop showed smut spores and all but one would require treatment (R.C. Russell). A slight infection was observed in 6 out of 48 fields examined in the Montreal district, Que. (T. Simard).

BACTERIAL BLIGHT (Xanthomonas translucens). A trace was recorded in the irrigation nursery, Saskatoon, Sask. (T.C. Vanterpool). Bacterial blight (X. translucens f. sp. hordei) was found in one field out of 17 examined in Man. (W.A.F. Hagborg).

SPIKELET BLIGHT (thrips) caused moderate damage in a field at Berwyn, Alta. (A.W. Henry).

RYE

ERGOT (Claviceps purpurea) records were - a trace in a field in Alta. (M.W.C.); infection very light about Saskatoon, Sask., but few fields visited (H.W.M.); infection less than in former years on fall rye at Fort Garry, Man.; sphacelial stage present on July 8; a cold wet spring appeared to retard germination of the overwintered sclerotia as they did not germinate

until late in June, about 2 weeks later than usual (A.L. Brown); trace in field at Swan River (W.E. Sackston); trace in field at Nictoaux and near Kentville, N.S. (J.F. Hockey).

POWDERY MILDEW (Erysiphe graminis). Slight infection on Prolific in the University plots, Vancouver, B.C. (W. Jones).

ROOT ROT (Helminthosporium sativum) caused trace of damage in a field at Vulcan, Alta. (W.C. Broadfoot).

LEAF RUST (Puccinia secalina) infection was slight to moderate on some varieties at the University, Vancouver, B.C. and at the Station, Agassiz (W. Jones).

SCALD (Rhyncósporium Secalis) was slight on some varieties at U.B.C., Vancouver, and at Agassiz, B.C. (W. Jones).

SURVEY OF NURSERY MATERIAL FOR PLANT DISEASES IN 1945

T. Johnson, B. Peturson and W.J. Cherewick

In Table 2 are given the results of examinations of material from 30 uniform rust nurseries across Canada. The examinations were carried out at the Winnipeg Laboratory.

Ten varieties of wheat, 8 of oats and 3 of barley were grown in the nurseries. The varieties were as follows: Wheat - Apex, McMurachy, Regent, Carleton, Little Club, Marquis, Spelmar, Thatcher, Vernal, and Norka; oats - Bond, Erban, Trispernia, Ajax, Vanguard, White Russian, S-811, and RL 1228 (Victoria x 524); barley - Goldfoil, Hoil's Hanna, and Plush. Varieties now or formerly of commercial importance in Canada are underlined.

Readings for each disease were made on all varieties and separate tables were prepared for the intensity of infection of the rusts and powdery mildew. The detailed tables, however, are omitted, but in Table 2 is shown the severity of each disease on the more susceptible varieties for each Station.

(Note: In the original report a brief general discussion on each disease was included; this material appears on the preceding pages at the appropriate points - I.L. Conners).

Table 2. Pathogenic fungi found present on wheat, oats, and barley grown at 30 localities in Canada in 1945.

Locality	Wheat						Oats				Barley			
	P.gr. Tritici	P. triticina	E. graminis	S. nodorum	S. Avenae f.	Head discolor. (Apex, Regent)	P. gr. Avenae	P. coronata	E. graminis	S. Avenae	P. graminis	P. anomala	E. graminis	S. Passerinii
Saanichton, B.C.	0	3	2	0	0	1	1	0	1	0	0	0	3	0
Smithers, B.C.	0	1	4	0	0	0	0	0	1	0	0	0	0	0
Agassiz, B.C.	-	4	2	0	1	3	2	0	0	1	0	3	3	0
Beaverlodge, Alta.	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Edmonton, Alta.	1	1	0	0	1	1	1	0	0	0	0	0	0	0
Lacombe, Alta.	1	1	0	0	1	1	1	0	0	0	0	0	0	0
Lethbridge, Alta.	0	1	4	0	0	0	0	0	0	0	0	0	0	0
Scott, Sask.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Melfort, Sask.	2	4	0	0	2	0	3	2	0	0	2	1	0	3
Indian Head, Sask.	3	4	0	0	1	0	2	1	0	0	1	1	0	0
Brandon, Man.	3	4	0	0	3	2	4	3	0	1xx	2	1	0	2
Winnipeg, Man.	2	4	0	0	3	2	4	4	0	1xx	2	3	1	2
Morden, Man.	3	4	0	0	3	1	4	4	0	-	2	1	0	4
Fort William, Ont.	3	4	0	1	3	1	3	1	0	0	2	2	0	0
Kapuskasing, Ont.	2	4	0	0	2	2	3	1	0	1x	2	1	2	0
St. Catharines, Ont.	1	4	2	0	2	0	1	2	0	1x	1	1	3	-
Guelph, Ont.	3	4	1	2	2	3	2	4	0	1x	1	3	4	0
Kemptville, Ont.	1	4	0	0	2	1	2	4	0	1xx	0	2	4	0
Ottawa, Ont.	2	4	3	0	1	1	3	4	0	0	1	1	4	0
Manotick, Ont.	1	4	1	0	2	1	2	3	0	-	1	1	3	0
Macdonald College, Que.	2	4	0	0	2	3	2	3	0	1x	0	1	4	0
Lennoxville, Que.	0	4	1	2	3	1	2	3	0	1	0	4	3	0
Ste. Anne de la Pocatiere, Que.	1	4	0	0	3	2	2	3	0	0	0	2	0	0
Normandin, Que.	2	4	1	0	1	1	2	2	0	1x	3	0	0	3
L'Assomption, Que.	2	4	1	0	2	3	3	4	0	0	1	3	3	0
Fredericton, N.B.	1	4	0	0	1	2	4	4	0	0	2	0	0	0
Kentville, N.S.	0	3	0	0	0	3	4	4	0	0	0	1	0	0
Pictou, N.S.	1	2	0	0	1	2	1	2	0	1xx	0	0	0	0
Lower South River, N.S.	1	1	0	0	0	1	3	2	0	0	1	0	0	0
Charlottetown, P.E.I.	0	4	0	0	1	1	1	1	0	0	0	0	0	0

x Proved to be S. Avenae by pathogenicity tests.
xx Proved to be lightly pathogenic to wheat, but not on oats. Therefore same as S. Avenae forma on wheat.

Note: 1 = trace; 2 = light; 3 = moderate; 4 = heavy.

PHYSIOLOGIC RACES OF CEREAL RUSTS IN CANADA IN 1945

T. Johnson, B. Peturson and W.J. Cherewick

In 1945, surveys were made of the distribution, in Canada, of physiologic races of the following cereal rusts: Puccinia graminis var. Tritici, P. triticina, P. graminis var. Avenae, P. coronata var. Avenae and P. anomala.

As in 1944, a study was also made of cultures originating from aecia occurring on naturally infected barberry and buckthorn in a number of localities in Eastern Canada.

Distribution of Physiologic Races of the Cereal Rusts

Stem rust of wheat was of minor importance in 1945 owing to the widespread presence of resistant varieties. In Man., however, infections upwards of 50% occurred on susceptible wheats. Leaf rust of wheat was generally severe except in Alta., western Sask., and some parts of the Maritime Provinces. In Man. and Sask. and in certain areas in Eastern Canada, wheats, such as Regent, which had been resistant in previous years, showed considerable susceptibility. Stem rust of oats was rather severe in Man. and eastern Sask. and locally in certain other parts of the country. Crown rust of oats occurred sparingly in eastern Sask., was very prevalent in Man., and appeared in epidemic form in many localities in Ont., Que. and the Maritime Provinces. Light to moderate infections of leaf rust of barley occurred in Man. and in scattered localities in Eastern Canada.

No significant change took place in 1945, in the distribution of physiologic races of Puccinia graminis var. Tritici. Race 56 predominated, as in past years, occurring in 60% of the 83 isolates studied. The 2 closely related races 17 and 29 occupied 2nd (11%) and 3rd (9.6%) place respectively. Two races, 118 and 152, that had not been collected previously in the field were each found once in uredinial collections on wheat in the Maritime Provinces. Both these races were encountered several years ago in cultures from aecia on barberries infected in the greenhouse. Other races collected, in order of prevalence, were 19, 38, 49, 32, 39, 80 and 87.

The distribution of physiologic races of P. triticina in 1945 differed from that of the previous year chiefly in the relatively greater number of isolates (26%) identified as race 128. This race was isolated in Canada for the first time in 1944, and its appearance coincided with the diminished leaf rust resistance of Regent and other wheat varieties with a similar type of resistance. Race 128 is scarcely distinguishable on the differential hosts from race 29 (7% of isolates), which has occurred in Canada for a number of years, but it attacks adult plants of Regent more severely than that race. That the increased

susceptibility of Regent, Renown and Coronation in 1945 was chiefly due to the presence of this race is indicated by the fact that 66% of the isolates from these varieties were identified as race 128. This race was most prevalent in Man. (46% of isolates), where Regent and Renown are commonly grown, but its predominance was no doubt exaggerated owing to so many rust collections being obtained on these varieties. Recent greenhouse studies on the reaction of Regent to other physiologic races have indicated that last summer, in certain areas, biotypes (particularly in races 5 and 15, which comprised 5 and 21% of the isolates) occurred capable of attacking this variety severely. In general, it seems clear that strains of leaf rust capable of attacking the above mentioned varieties are becoming prevalent in areas where they are mostly widely grown. Other races isolated were, in order of prevalence, races 9, 3, 29, 76, 1, 38, 11, 2, 101, 113, 81, 103, 32, 52, 65, and 104 among the 203 isolations.

In P. graminis var. Avenae, a further increase took place in 1945, in the prevalence of races 8 (30% of the isolates), 10 (9%) and 11 (9%), which, though distinguishable, may be regarded for practical purposes as one race. Their prevalence, as given above, is probably exaggerated owing to the fact that many rust collections came from the varieties Vanguard and Ajax, which do not harbour races 1, 2, and 5. Nevertheless, races 8, 10 and 11 are now collected so frequently that they must be regarded as of common occurrence. The only other notable feature of the oat stem rust survey was the presence of races 4 (0.6%) and 6 (2.5%). The former was last collected in 1936 and the latter in 1937. Any further spread of these races would be of some concern for the reason that they attack varieties with the White Russian as well as the Richland type of resistance. Other races isolated were races 1 (6%), 2 (24%) and 5 (21%) from 161 isolates.

Ten physiologic races of P. coronata var. Avenae were isolated from uredinial collections of crown rust obtained from many widely separated localities in Eastern Canada and the Prairie Provinces in 1945. These 10 races and percentage of isolates of each race were as follows: race 1, 8.6%; 2, 19.7%; 3, 20.2%; 4, 5.8%; 5, 22.1%; 6, 20.7%; 24, 0.5%; 34, 1.4%; 38, 0.5%; and 54, 0.5%. They have all been collected in Canada in previous years and the 6 first named races comprised well over 90% of all the isolates, as in former years. There was, however, a considerable change in the relative prevalence of different races. Race 5, which has usually been the least abundant of the 6 common races increased greatly in prevalence and became the predominant race, slightly exceeding races 2, 3 and 6, which have been predominant for several years. Race 34, although of rare occurrence at least in Canada, is of some interest because it heavily attacks Bond, a variety much used (owing to its immunity to most crown rust races) in breeding for crown rust resistance. This race, of which 3 isolates were obtained this year, was not collected in 1943 and 1944 and only occasionally prior to that. In all, 208 collections were studied.

In 1945, 44 collections of P. anomala were studied and from these, 3 distinct races were isolated.

Infection Studies with Aecia on Berberis and Rhamnus in 1945

The infection studies with aecia on Berberis and Rhamnus undertaken in the spring of 1944 were again made possible in 1945 through the generous collaboration of the following, who collected and forwarded aecia: R.R. Hurst, Charlottetown, P.E.I.; J.R. Cowan, Nappan, N.S.; S.F. Clarkson, Fredericton, N.B.; R.A. Ludwig, Macdonald College, Que.; Dr. J.E. Jacques, Montreal, Que.; and W.H. Waddell, Guelph, Ont.

Spores discharged from aecia on barberry were sown on seedlings of wheat, oats, rye, Agrostis alba, Poa pratensis and P. compressa; spores from aecia on buckthorn were sown on seedlings of oats, Dactylis glomerata, Lolium perenne, Holcus lanatus, Calamagrostis arundinacea, C. canadensis, Agrostis stolonifera, Festuca sylvatica and Phalaris arundinacea. The distribution of the collections by provinces was as follows: aecia on barberry: Man. 2, Ont. 2, Que. 8, N.B. 7, total 19; aecia on buckthorn: Ont. 2, Que. 2, N.B. 9, total 13.

The following varieties of P. graminis were isolated: Secalis only 8, Avenae only 1, Agrostidis only 1; Avenae and Secalis 4; Secalis and Agrostidis 2; Tritici, Avenae, and Secalis 1; Avenae, Secalis and Agrostidis 1; and Avenae, Secalis and Poae 1. The single isolate of variety Tritici was identified as race 15, and isolates of Avenae were 3 isolates each of races 2, 5 and 8, and 2 isolates of race 6a.

Isolations from aecia on Berberis, summarized above, show that, as in the previous year, P. graminis var. Secalis was the predominant variety of stem rust in nearly all localities. P. graminis var. Agrostidis occurred only in aecial material gathered in N.B. P. graminis var. Poae was found in only one locality (Guelph, Ont.) and P. graminis var. Tritici occurred only in aecial material at Winnipeg, Man. Next after P. graminis var. Secalis, the variety of most common occurrence was P. graminis var. Avenae. Among the races identified, it may be noted that race 6a has not been found previously in Canada, or, as far as is known, anywhere else. It may be distinguished from race 6 by a more variable reaction on the oat variety White Tartar, and by a somewhat greater pathogenicity on some recently developed oat hybrids that are highly resistant to race 6.

Spores from aecia of Rhamnus cathartica, in every instance heavily infected seedlings of Victory oats, but failed to infect seedlings of L. perenne, D. glomerata or H. lanatus. Apparently the aecial infections on R. cathartica were largely or wholly caused by Puccinia coronata var. Avenae. Races 2 and 3, which predominated in the field in 1944 were the ones most frequently isolated from aecial infections of 1945. Besides these two races, single isolations of the rather rarely occurring races 34 and 45 were obtained. Race 45 did not occur in 1945 in collections of uredinial origin and race 34 was collected only three times.

The aeciospores from R. Frangula failed to infect Victory oats normally. In one case the oat seedlings became visibly flecked, but no rust pustules were formed. Of the 8 grass species tested, 6 were immune, but weak infections, which produced teliospores typical of crown rust, developed on a few plants of C. canadensis and A. stolonifera. Although the rust on R. Frangula can be maintained in culture on the two grass species, the weak nature of the infection indicates that they are not congenial hosts. The identity of the rust on R. Frangula has likewise not been definitely established.

II. DISEASES OF FORAGE AND FIBRE CROPS

ALFALFA

BLACK STEM (Ascochyta imperfecta) was general and caused moderate damage in some fields at Chilliwack and Agassiz, B.C. (W. Jones). Black stem was recorded in 116 fields out of 146 examined in Alta.; infection was a trace in 17, slight in 79 and moderate in 20. Damage did not develop until late in the season, but it then occurred in a large proportion of the stands examined. Infection was again severe on Orestan and only slight to moderate on the other varieties at Lethbridge; it was slight to moderate at Lacombe (M.W.C.). Infection was slight at Melfort, Sask., in late June, moderate at Saskatoon in late July and in the White Fox alfalfa area in late August (H.W.M.). Black stem is very common on alfalfa throughout Man. (W.J. Cherewick). A field of alfalfa examined on June 26 at Cayuga, Ont., was virtually destroyed by black stem. The pathogen was identified by M.W. Cormack (J.D. MacLachlan, G.A. Scott).

A comprehensive study of Ascochyta imperfecta has recently been completed by M.W. Cormack (Phytopath. 35(10): 838-855. 1945). He finds that A. imperfecta is "primarily a parasite of stems and leaves of alfalfa and is of doubtful importance on other naturally infected hosts". It is regarded as less important than other root rotting pathogens in Alta. The numerous pycnidia that develop on affected stems in late fall are the most important source of inoculum. Infected seed may be of prime importance in disseminating the fungus to new fields or areas, but chemical treatment of the seed requires further study (I.L.C.).

CROWN ROT (low-temperature basidiomycete). The pathogen was isolated from a sample sent by S.E. Clarke from a severely damaged field at Vernon, B.C. (M.W. Cormack).

The estimated damage from crown rot in alfalfa fields examined in Alta. in 1945 is given below:

District	Fields Examined	Percentage of Fields Damaged		
		Sl.	Mod.	Total
		%	%	%
Southern Alta.(irrigated)	71	17	4	21
Central Alta.	165	31	3	34
All Alberta	236			29

Winter conditions in Alta. were apparently not favourable for the severe development of this disease in 1945. The damage consisted mainly of a partial rotting of the crown and killing of the crown buds, which resulted in a weakening of the plants (M.W. Cormack).

Damage from crown rot was moderate to severe on Ladak and other susceptible varieties in the plots of the Station, Swift Current, Sask. No killing occurred in Medicago falcata and in several hybrid strains (M.W. Cormack). Crown rot caused slight damage in a breeding plot at Saskatoon (H.W.M.).

BACTERIAL WILT (Corynebacterium insidiosum). The estimated damage caused by bacterial wilt in alfalfa fields examined in Alta. in 1945 is given in the table below.

District	Fields Examined	Percentage of Fields Damaged Tr.	Sl.	Mod.	Sev.	Total
		%	%	%	%	%
Brooks-Lethbridge (irrigated)	71	20	23	14	4	61
Clover Bar-Bremner (detailed survey)	109	26	6			32
Other districts in Central Alta.	56	9				9
All Alberta	236					35

Bacterial wilt was again found in all alfalfa stands 3-years-old or older examined in the irrigated district, and it was also present in several of the 2-year-old stands. It is apparently responsible for the almost complete disappearance of old stands of alfalfa in the Brooks district and for their rapidly decreasing numbers in the other irrigated areas.

The dry season of 1945 had a marked retarding effect on the disease in fields previously surveyed east of Edmonton. In four of these fields, where the damage ranged from 10 to 20% in 1944, an average of 6% of the plants were drying this year. The disease appeared, however, in several new fields in this district and was found for the first time causing a trace of damage in fields west of Edmonton and at Winfield and Cherhill. It probably became established in these fields during the wet seasons of 1942-44.

In a detailed survey made by R.W. Peake at the Station, Lethbridge, the percentage of damaged plants in the different varieties was: Ranger 4.2%, Viking 4.5%, Ladak 9.2%, Grimm 20.5%, Autogamous 24.5%, Ontario Variegated 42% and U.B.C. Strain 45.3%. Damage to Grimm in the rotation plots was: 1st and 2nd year 0, 3rd year 0.5%, 4th year 12.1%, 5th year 28.8% and 6th year 63.8% (M.W. Cormack).

Two samples of alfalfa collected by E.J. Britten and W.J. Chorewick, one at the Illustration Station, Pipestone, Man., and the other about 2 miles north of the Station, were found affected by bacterial wilt. In both samples Gram-positive bacteria were abundant in discoloured areas of the roots. This is the first report of bacterial wilt in Man. (W.A.F. Hagborg).

ROOT ROT (Cylindrocarpon Ehrenbergi, etc.). The damage was moderate in the plots at Edmonton, Alta., and slight in several fields in central Alta. (M.W. Cormack).

WILT (Fusarium Scirpi var. acuminatum). A moderate infection was present in the alfalfa breeding plots at Saskatoon, Sask.; some plants were killed. (H.W. Mead, W.L. Gordon).

LEAF SPOT (Leptosphaeria pratensis (Stagonospora Meliloti), the less common of the two leaf spots of alfalfa in Man., was observed in several districts; the spots are somewhat irregular and pale buff in colour (W.J. Chorewick).

DOWNY MILDEW (Peronospora aestivalis). A slight infection was recorded at Lytton, B.C. (G.E. Woolliams). Infection was a trace in 4 fields, slight in 6 and moderate in 3 out of 146 examined in Alta.; a slight infection was present in the plots at Edmonton and Olds (M.W. Cormack). A severe infection was found in one hybrid strain at the Station, Swift Current, Sask., in late June and a trace on other strains and varieties (M.W. Cormack).

YELLOW LEAF BLOTCH (Pseudopeziza Jonesii) caused considerable defoliation in the plots at the Farm, Agassiz, B.C. (W. Jones). A collection of this leaf blotch was made on Grimm at Oliver by J.C. Wilcox (G.E. Woolliams). Infection was slight in 2 fields and moderate in 2 out of 146 examined in Alta.; a moderate infection was also reported from a field in the B.C. block of the Peace River district (M.W. Cormack).

COMMON LEAF SPOT (Pseudopeziza Medicaginis). Infection was a trace in 2 fields, slight in 10 and moderate in 2 out of 146 examined in Alta. (M.W.C.). The disease moderately affected a plot at Saskatoon, Sask., causing some defoliation; a moderate to severe infection has been present in this plot for several years (H.W.M.). Of the 2 leaf spots of alfalfa found in Man., the small circular, dark brown spot caused by P. Medicaginis is the more common. The leaf spot and black stem diseases of alfalfa and sweet clover (q.v.) are only of minor importance under good cultural practice. A few fields were observed, however, where the previous year's crop was left unharvested and thus an abundance of inoculum overwintered on the old stems and debris permitting the virtual defoliation of the new growth before the crop was cut (W.J. Cherewick). A moderate infection was noted in the neighborhood of Guelph, Ont. (J.D. MacLachlan). A specimen of alfalfa collected on Sept. 30, 1944, in Middlesex Co. by W.D. Sutton was moderately infected (I.L.C.). This leaf spot caused slight defoliation in a field at Kentville, N.S. (J.F. Hockey).

ROOT ROT (Rhizoctonia Solani). R. Solani was occasionally isolated from plants damaged earlier in the season by the crown rot pathogen, and other low-temperature fungi. It appears to be mainly a secondary parasite of alfalfa and sweet clover under Alberta conditions (M.W. Cormack).

CROWN ROT (Rhizoctonia Solani strain) is the most widespread and destructive disease of alfalfa and sweet clover in Man. The disease, although the general symptoms are similar, is apparently distinct from the crown rot of alfalfa (q.v.) reported by Cormack in Alta.

In districts where alfalfa is more commonly grown, the disease often reduces the stand of plants by more than 50% in the third year. Many farmers are of the opinion that it is no longer profitable to grow alfalfa because it is difficult to establish a good stand of the crop, especially in short rotations, owing to this disease. Sweet clover, being a biennial crop, usually does not suffer as serious damage, although fields have been observed where more than 50% of the plants had been killed.

The pathogen attacks the plants at the soil level and in seedlings causes a damping off, whereas in older plants it produces a dry rot of the crown. Infected plants are predisposed to "winter-killing".

A root canker of alfalfa was found, for the first time in Man., in a few districts of the western and north central sections of the province. The disease, originally described by O.F. Smith (Phytopath.33: 1081. 1943), is also caused by a strain of R. Solani (W.J. Chorewick).

STEM ROT (Sclerotinia sclerotiorum). Several affected plants were found in type selection plantings at Nappan, N.S.; sclerotia were abundant on old stems and around the crowns (J.F. Hockey).

RUST (Uromyces Medicaginis). A specimen of alfalfa collected in Middlesex Co., Ont., on Sept. 30, 1944, by W.D. Sutton shows a light sprinkling of uredinia (I.L. Conners).

CROWN WART (Urophlyctis Alfalfae) was reported for the first time in Canada when M.F. Clarke noticed the disease on May 16 at Agassiz, B.C., while alfalfa breeding material of a media-falcata cross developed at the University, Vancouver, B.C., was being set out. The organism was identified by W. Jones, at Saanichton and confirmed at Ottawa. Some 12% of the 275 lines transferred showed pronounced crown wart symptoms. When the U.B.C. plots were later examined a slight infection of crown wart was found. A slight infection was also found by W. Jones and M.F. Clarke on Lytton and Grimm in 2 fields at Chilliwack, but no infection was found elsewhere on the Farm at Agassiz, in the district, nor in the Matsqui, Dewdney or Sumas districts. The disease is thought to have been at the University as early as 1936, but its identity was not established. The disease has not been found in any of the plots established from plants or seeds in B.C. It is a matter of speculation how the fungus was introduced in the University plots, but there is the possibility that it came with alfalfa hay and reached the plots in liberal applications of manure (I.L. Conners). A careful examination of the U.B.C. strain of alfalfa did not reveal any evidence of this disease in plants grown from cuttings at Swift Current, Sask., nor in those grown from seed at Lethbridge, Brooks, Lacombe and Edmonton, Alta. (M.W. Cormack).

MOSAIC (Medicago virus 2). A trace of mosaic was found in 2 fields of Grimm at the Station, Fredericton, N.B.; affected plants were seen in a field near Oromocto (D.J. MacLeod). Mosaic affected an occasional plant in Queens Co., P.E.I. (R.R. Hurst).

WITCHES' BROOM (virus) caused slight damage in the plots at Edmonton, Alta. (M.W.C.).

COMMON CLOVER

LEAF SPOT (Cercospora zebrina). A slight infection was present in 3 fields out of 18 of alsike clover examined in west-central Alta. (M.W. Cormack). A slight infection was noted on alsike clover at Fort Garry, Man. (W.L. Gordon). A slight infection was found in 4 fields and moderate in one of red clover out of 21 examined in June, and a slight infection in all 19 examined in August in the Montreal district, Que. (T. Simard).

BLACK SPOT (Cymadothea Trifolii). A moderate infection occurred on some leaves of hybrid clover in the University area, Fort Garry, Man. (W.L. Gordon).

POWDERY MILDEW (Erysiphe Polygoni) was found throughout the Interior of B.C. on red and alsike clover, but the infection was usually slight (G.E. Woolliams). Infection was slight to moderate in 8 out of 13 fields of red clover and in one out of 18 fields of alsike examined in west-central Alta.; a trace occurred in the red clover plots at Lacombe (M.W. Cormack). A slight infection was recorded on red clover at Choiceland, Sask. (T.C. Vanterpool), and a heavy infection on some red clover plants at the University, Fort Garry, Man. (W.L. Gordon). Powdery mildew was moderate about Guelph, Ont., affecting about 50% of the leaves (J.D. MacLachlan). Infection was slight in 13 fields and moderate in one out of 19 examined in August in the Montreal district, Que.; no mildew was observed in June (T. Simard).

LEAF SPOT (Gloesporium spadiceum). A slight infection was present in 4 fields out of 13 of red clover examined in west-central Alta. (M.W. Cormack).

ANTHRACNOSE (Kabatiella caulivora). Infection was slight in 3 fields of red clover examined in west-central Alta. It was slight to moderate on Siberian red clover and a trace to slight on other varieties at Lacombe and Olds (M.W. Cormack). Anthracnose was rather severe on red clover in O.A.C. foundation plots, Guelph, Ont.; the range had a scorched appearance (J.D. MacLachlan).

LEAF SPOT (Leptosphaeria pratensis (Stagonospora Meliloti). Infection in the 18 fields of alsike clover examined in west-central Alta. was estimated to be: trace to slight in 10 fields, moderate in 5 and severe in 1 (at Entwistle); infection was also moderate in the plots at Lacombe (M.W. Cormack).

BACTERIAL LEAF SPOT (?Pseudomonas syringae). A trace was present on red clover in the Division of Forage Crops, C.E.F., Ottawa, Ont. (R.G. Atkinson). What appeared to be a bacterial leaf spot affected about 20% of the leaves in one corner of a field of red clover on the Auld Farm, O.A.C., Guelph; isolations were made by the Department of Bacteriology, but attempts to reinfect red clover plants failed (J.D. MacLachlan).

LEAF SPOT (Pseudopeziza Trifolii). Infection was slight in 11 fields and moderate in 4 out of 21 of red clover examined in June in the Montreal district, Que.; a slight infection was recorded on the new growth in 3 out of 19 examined in August (T. Simard).

LEAF SPOT (Stagonospora recedens) was of common occurrence and caused considerable damage to the foliage at Agassiz, Sumas, Chilliwack and in North Saanich, B.C. (W. Jones). Isolations made from material collected at Agassiz by W. Jones yielded cultures of S. recedens (M.W. Cormack). Infection was slight in 2 fields and moderate in 2 out of 13 of red clover examined in west-central Alta.; a trace to slight infection was found in the variety plots at Lacombe (M.W. Cormack). A light infection was present in a field of red clover near Carp, Ont. (D.B.O. Savile). A slight infection was recorded in one field of red clover in June and 2 in August in the Montreal district, Que. (T. Simard).

LEAF SPOT (Stemphylium sarcinaeforme). Traces only were observed on red clover in the Forage Crop plots, C.E.F., Ottawa, Ont. (R.G. Atkinson). Infection was slight in 8 fields of red clover and moderate in 3 out of 21 examined in June and slight in 12 fields out of 19 in August in the Montreal district, Que. (T. Simard).

RUST (Uromyces spp.). A heavy infection (U. Trifolii) was present on some plants of alsike clover in the University area, Fort Garry, Man. (W.L. Gordon). Rust infection (U. fallens) was slight in 5 fields of red clover out of 40 examined in the Montreal district, Que. (T. Simard). A trace of rust was observed on red clover in Queens Co., P.E.I. (R.R. Hurst).

MOSAIC (virus). A slight infection was recorded in one field of red clover in June and in 5 in August in the Montreal district, Que. (T. Simard). A trace of mosaic (Trifolium virus 1) was found in 4 fields of red clover and one of white at the Station, Fredericton, N.B.; it was also found in separate fields of both crops in several counties (D.J. MacLeod).

SWEET CLOVER

STEM CANKER (Ascochyta caulivora). A severe infection was found on scattered plants in 2 fields at Strathmore and in roadside stands in southern Alta. This is the first time that the "goose-neck" symptoms have been observed in Alta. (M.W. Cormack). The goose-neck disease, which causes hypertrophy of the host plant, has been observed at Brandon, Man., during recent years but it has not been found in other parts of the province (W.J. Cherewick).

BLACK STEM (Ascochyta lethalis) is very common on sweet clover throughout Man. (W.J. Cherewick).

ROOT ROT (Cylindrosporium Ehrenbergi, etc.) caused moderate damage in the plots at Edmonton, Alta., and in a few roadside stands (M.W. Cormack).

ROOT ROT (Fusarium spp.). Diseased plants from Essex, Ont., were received from J.D. MacLachlan and sent to W.L. Gordon for examination. After the roots were washed, sporodochia of F. avenaceum were found on them and when pieces of root were cultured, it was the predominant isolate; other fungi isolated were F. Solani, F. oxysporum and Trichoderma (I.L.C.).

LEAF SPOT and STEM BLIGHT (Leptosphaeria pratensis (Stagonospora Meliloti). A trace to a slight infection was general on sweet clover stands examined in Alta. (M.W. Cormack). A moderate infection was observed on Arctic at Melfort, Sask., on June 21 (H.W.M.) and on leaves of scattered plants at Boissevain, Man., on June 12 (W.J. Cherowick).

ROOT ROT (Phytophthora Cactorum) caused slight damage in several roadside stands in southern Alta. (M.W. Cormack).

CROWN ROT (Rhizoctonia Solani strain) is the most widespread and destructive disease of alfalfa and sweet clover in Man. The disease is described more fully under alfalfa (q.v.) (W.J. Cherewick).

ROOT ROT (Sclerotinia sativa) caused moderate damage in the plots at Edmonton, Alta., and on the Pioneer variety at Lacombe (M.W. Cormack).

MOSAIC (virus) is quite general in the Okanagan Valley, B.C., wherever the plants are growing (G.E. Woolliams).

VETCH

LEAF BLIGHT (Ascochyta sp.) was severe in a field of hairy vetch (V. villosa) being grown for seed at Delhi, Ont. In 1944 the field was sown to vetch and oats and a healthy crop harvested. In the fall of 1944 the same field was sown to rye and vetch. In mid-June 1945 the field appeared to be free from disease, but by July 15 most of the leaves had dropped except at the tips of the stems. A species of Ascochyta, tentatively identified as A. Pisi, was found fruiting on stems, leaves and pods, O.A.C. Myc. Herb. 733 (J.D. MacLachlan).

BUCKWHEAT

YELLOWS (Callistephus virus 1) was general on tartarian buckwheat in Westmorland, Queens, Kings, Sunbury, York, Carleton and Victoria Counties, N.B.; a trace was found in Silver Hull (Fagopyron esculentum) at the Station, Fredericton (D.J. MacLeod). An occasional plant was found affected in a 2-acre field in Queens Co., P.E.I. (R.R. Hurst).

CORN

RUST (Puccinia Sorghi). A 25% infection was present on one specimen from Queens Co., P.E.I., brought to my attention (R.R. Hurst).

SMUT (Ustilago Maydis) was generally prevalent about Guelph, Ont. (J.D. MacLachlan). A trace of smut was seen on Quebec 28 at Macdonald College, Que. (R.O. Lachance). A trace was recorded in a field in Sunbury Co., N.B. (D.J. MacLeod). An occasional "boil" was seen in a large field in Queens Co., P.E.I. (R.R. Hurst).

FLAX

Prof. T.C. Vanterpool, University of Saskatchewan, Saskatoon, Sask., has prepared a summary of his observations, entitled "Flax Diseases in Saskatchewan in 1945."

Seedling blight exerted its usual toll on flax stands and root rot affected yields in some areas, but other pathogenic diseases were generally light. Physiological troubles were more conspicuous. Below average yields were again experienced in the west-central part of Sask. because of low rainfall, but yields improved further east and northeast. It was expected that flaxseed samples from the 1945 crop would show small amounts of seed-borne diseases, but platings to date show several samples from the dark-brown soil zone to be infected with Polyspora Lini, and several from the park belt to be infected with Alternaria linicola. This is attributed to the wet, cold fall in many districts, which delayed harvest and permitted seed infection to build up. It suggests that, from the disease angle, flax intended for sowing should be cut as soon as possible after it is ripe.

SEEDLING BLIGHT (Rhizoctonia Solani). Of 16 farm fields examined closely for seedling blight, 3 showed no damage, 3 trace, 3 slight, 5 moderate and 2 severe. In a few localities blighted seedlings were buried by drifting soil. Isolations were made from blighted seedlings from Saskatoon, Cory, Asquith, Kinhop, Juniata, Young, Viscount, Grandora and Scott, and in every instance R. Solani predominated. Little seedling blight has been found on flax on brome-grass sod. R. Solani was also the chief cause of seedling blight in experimental plots where the seed was inoculated with Polyspora Lini, Sphaerella Linorum or Phoma sp. Colletotrichum Lini, however, was the cause of seedling blight in the plots inoculated with this fungus.

RUST (Melampsora Lini) caused relatively little damage this year. Several fields of Royal on flax stubble showed moderate infection, but otherwise infection was trace to slight. In two fields about half a mile apart where Royal was grown on Royal stubble, one field in which the stubble had been ploughed under showed a trace of rust at harvest, and the other field in which much of the old flax straw was still exposed was moderately infected. This happened in a year not particularly favourable to flax-rust development. Fields are frequently seen in which the complete removal of flax stubble by ploughing or burning has not been effected. In order to prevent serious losses from infections of rust and other stubble-borne diseases, for example,

stem break and browning (see below), the practice of following flax with flax on the same land should be discontinued. As in 1944, rust was unusually light on wild flax (Linum Lewisii).

STEM CANKER (Melampsora Lini and Fusarium spp.). Light.

WILT (Fusarium oxysporum f. Lini). For the first time no wilt was found on survey and no reports were received from farmers.

STEM BREAK AND BROWNING (Polyspora Lini). The June survey indicated that there was the usual amount of seed-leaf infection; this was checked by miscroscopic examination and culturing in some instances. Weather conditions, however, did not continue to favour the disease as neither the stem-break nor the browning phase was conspicuous in the pre-harvest survey. Only one severe stem-break report was received (Canwood, Sask.). Of nine 1945 flax seed samples plated on malt extract agar, two were infected with P. Lini, with 6 and 15% respectively. It is probable that late harvesting of the flax in many districts permitted late development of the disease and infection of the seed. In artificially inoculated experimental plots stem lesions were late in appearing and developed slowly. There was, however, abundant inoculum in these plots when much of the late flax harvesting was being done on the farms, which suggests that there was plenty of time for seed infection where the disease was present in incipient form earlier. Thus to prevent a build up in the percentage of seed-borne Polyspora, flax seed for sowing should be cut as soon as it is ripe.

LATE ROOT ROT (miscellaneous fungi). Many instances were observed both in experimental plots and on survey where slightly stunted, prematurely ripened plants with slightly shrivelled seed were growing in between vigorous greener plants. This was often quite general and appeared definitely to be a disease condition. It doubtless contributed largely to many low yields. Premature ripening of flax in large areas in many flax fields, as for exampled at Earl Gray and Cory, was very common and one would hesitate to attribute much of this type of trouble this year to root rot. The same conspicuous "spotty" ripening of barley and oats on stubble in the same localities, suggest that soil and moisture factors were more intimately involved.

DIE-BACK (non-pathogenic). This trouble was common over central and northeastern Sask. Numerous isolation attempts were made. Where fungi were obtained they were very largely Alternaria species, not of the A. linicola type. Even early sown flax was late in "ripening off" and in most of the affected fields die-back plants and plants with the whole of the stems still green would be indiscriminately scattered; in a few fields, especially in the northeast, virtually all of the plants showed die-back, i.e., the top third would be brown and the lower two-thirds green. There was no consistent difference in size of seed on the two types of plants. Hypothetically, it seems that the type of trouble commonly referred to as die-back in Saskatchewan, is an attempt by the plant to adjust itself to adverse environmental conditions at ripening time.

HEAT CANKER. Severe damage was observed on June 23 at the Scott Station in four plots sown in an east-west direction (instead of the ordinary north-south direction). The damage followed three days of high temperatures, viz., June 20, 86°F., June 21, 91°F., and June 22, 86°F. Elsewhere only traces of heat canker were found.

CHLOROSIS. A relatively mild chlorosis appears early every summer on flax in the "dates of seeding" plots at the University where a narrow strip of alkaline (saline) soil runs across the plots (P.D.S. 23:23). Cereals (wheat, oats, barley and rye) in the same block showed no signs of yellowing on the alkaline strip.

WIND DAMAGE

a. WITHER-TIP. In certain plots at the University and on farms near Revenue, Tramping Lake and Dodsland, strong winds and drifting sand caused a complete collapse of the top half inch of seedlings in the fourth to sixth true leaf stage, the cotyledons usually remaining turgid. Occasionally the whole of the seedling above ground would be withered. If examined shortly after damage had occurred, the seedlings would be turgid at and below ground level, which symptom distinguishes them from the seedlings blighted by Rhizoctonia Solani which are collapsed at and usually below ground level.

b. BASE ENLARGEMENT. In many exposed flax fields a large percentage of plants could be found having basal enlargements two and sometimes three times the diameter of normal plants, but gradually tapering off to normal diameter half to three-quarters of an inch above and below ground level. The surface of the swellings was roughened with protective tissue. There was invariably a free space around each affected plant where the soil had been pushed back by the intermittent bending of the plants to and fro by strong winds. This trouble was particularly common in exposed fields where the stand had been reduced by seedling blight or heat canker, as at the Scott Station. No reduction in seed size in affected plants could be discerned, but comparative seed weights were not taken.

DICHLOROPHENOXY-ACETIC ACID (2-4-D) INJURY. When used as a weed spray on flax, this chemical produced enlargements with longitudinal fissures at the base of the stem and upper portions of the main root, while the finer branch roots tended to proliferate. Many plants died and the majority of the remainder were unthrifty.

SEED-BORNE BACTERIA. Northern-grown flax seed samples with a high percentage of internally-borne bacteria are commonly encountered. Infected seed usually fails to germinate but numerous mass and single cell cultures from such seed have failed so far to show other than weak pathogenicity on artificially inoculated flax seed.

PHOMA FOOT ROT (?). Over a period of two years several isolates of an extremely virulent species of Phoma have been secured from flax seed, from stems collected in late summer, and from overwintered straw. The pathogen causes severe pre-emergence killing in artificially inoculated soil in the greenhouse and in the field, but no foot rot, as reported from Ireland,

Europe, Australia, etc., for Phoma sp., has been observed. Little is known of the type and extent of damage which it produces under field conditions. As a seed parasite, it ranks close or equal to Colletotrichum Lini in reducing stands, and it is believed that under conditions conducive to its development it would cause considerable damage. The spore measurements agree most closely with those of Phoma exigua.

SELENOPHOMA ON FLAX. In the late summer of 1944 mature pycnidia of a species of Selenophoma were found on the finer branches and pedicels of flax in the experimental plots at Saskatoon and on a sample from Elstow. Pure cultures were readily obtained. The typical lunate spores averaged 18.8 microns by 2.5 to 3.3 microns. Seed inoculation has demonstrated only weak pathogenicity in the seedling stage. This appears to be the first report of a Selenophoma on Linum. In 1945, the same fungus was fairly common before harvest on the pedicels and finer branches of several varieties of flax in the experimental plots at Saskatoon. They appeared to be more plentiful on plants affected with die-back (see above) and on plants with early maturing dark brown bolls and pedicels.

A similar report of "Flax Diseases in Manitoba in 1945" has been prepared by W.E. Sackston, Dominion Laboratory of Plant Pathology, Winnipeg, Man.

Spring rains and cold weather delayed seeding by 2 to 4 weeks in many localities in Man. As flax is sown by many growers only after seeding of cereals is finished, and is sometimes used to fill in low wet spots in grain fields when they become sufficiently dry, many fields of flax were extremely late this season.

PASMO (Septoria linicola) appeared relatively late in farm fields; it was not definitely determined before a survey made Aug. 28 to Sept. 1. At that time, it was found in 19 of the 27 fields examined. The disease was a trace in 10 fields, light to moderate in 6, and severe in 3. On the other hand, pasmo had developed in inoculated plots at Winnipeg and Morden by mid-July, and was severe on leaves and stems early in August. The effect on yield was very pronounced; in field experiments at Winnipeg, inoculated plots of 2 highly susceptible varieties yielded only a third as much seed as check plots, while inoculated plots of 2 somewhat resistant varieties yielded only half as much as the uninoculated checks. Some of the varieties in the test plots at Winnipeg, Morden and Brandon were severely diseased, while others showed little or no pasmo. As these plots were not necessarily exposed to uniformly heavy infection, however, no definite conclusions on varietal reactions could be drawn from them. Septoria linicola was isolated from lesioned cotyledons of volunteer flax seedlings, collected in the variety test plots at Winnipeg Oct. 11. Alternaria sp. grew from the same tissues in many cases.

ANTHRACNOSE (Colletotrichum Lini). Seedlings of several sets of differential varieties being used to identify races of flax rust in the greenhouse, in January, 1945, developed conspicuous, water-soaked lesions on the cotyledons; these later dried out and turned brown, and in some cases the seedlings died. Isolations yielded pure cultures of C. Lini,

which was proved to be the pathogen by inoculation tests. Varietal differences in susceptibility were observed in inoculation tests. The outbreak of anthracnose in the greenhouse was traced to plants of the variety Bombay, from which rust had been taken. Dr. W.G. McGregor, Central Experimental Farm, Ottawa, sent specimens of diseased flax seedlings collected in June from 3 fields of Dominion fibre flax, grown near Richmond, Ont., from one seed source. In one field 95% of the seedlings were diseased, and about 30% were killed. Pure cultures of C. Lini were isolated from 60% of the tissues plated from the most severely diseased sample; the same organism predominated in the isolates from the other two samples. Leaf symptoms similar to anthracnose were seen in many farm fields examined in Man. in June; the only material from which C. Lini was isolated, however, was from the plots at the Brandon Farm, grown from seed received from Ottawa. C. Lini was also isolated from field material collected in July from diseased plants of Koto and Buda grown in demonstration rod rows near Teulon, and from Crystal and fibre flax grown in the plots of the Fibre Flax Pilot Plant at Portage la Prairie.

DAMPING OFF (? Pythium and Fusarium). Dead seedlings occurred in small patches in fields in June. Less than 1% of the plants were affected in farm fields, but more injury occurred in row plots at Morden, where it was most conspicuous in fibre flax. Platings yielded cultures of Pythium sp. and Fusarium sp. in a few cases, but most of the tissues gave rise to a miscellaneous assortment of fungi, as the seedlings had been dead for some time before they were collected.

HEAT CANKER (non-parasitic). Moderate injury due to heat canker was observed at Fannystelle and Portage la Prairie early in July by J.E. Machacek. Late in July, dead flax plants were received from Treherne, with reports of serious loss in a field of Royal flax there. Examination of the field showed the damage to be caused by heat canker. The injury first became apparent early in July; when the field was visited, about 25% of the plants were dead, others were seriously affected, and gaps in the rows indicated that plants which had died earlier had been beaten into the ground by rains. About 50% loss occurred. Affected plants turned yellow, and a swelling developed on the stems at or near the soil line. Eventually these plants fell over, died, and turned brown, although some plants seemed to recover. Affected plants were scattered throughout the field which had been cultivated intensively before flax was sown about May 15. The soil was a light sandy loam. Affected plants were scarce in another field of flax on the same farm, although the grower reported that more injury had been apparent there a week earlier.

ROOT ROT AND WILT (Fusarium oxysporum form Lini). Isolations from root-rotted plants collected in fields gave only Alternaria sp. From 1 to 2% of dead plants occurred in rows of fibre flax grown at the University of Manitoba when the plots were examined for disease at the end of August. The roots of the dead plants were grayish in colour. Platings of diseased and apparently healthy roots from the same plots gave Fusarium oxysporum f. ? Lini from 100% of the diseased tissues, and from about 15% of the "healthy" ones.

DROUGHT INJURY. Severe drought and heat injury were observed in several fields near Pipestone late in July. Large patches of prematurely brown and dry plants occurred in one field; the bolls were shrivelled and dead. In a large field, all the leaves below the flowering branches were dead; those on the peduncle appeared badly scorched. Some shrivelled flower buds persisted on the plants. The bolls were dry and brown, and contained only small, thin seeds.

LEAF SPOTS of various types occurred on flax plants throughout the growing season. In June the spots resembled those of anthracnose, although Colletotrichum Lini was isolated from only one collection. The most prevalent spots in July and August were dark brown, about 1 millimetre or less in diameter, and occurred at random on leaves at all levels on the stem. It was estimated in severe cases that these spots occupied 20% of the total leaf area. Other spots were light brown to dark brown in colour, fairly regular in outline, round, oval, or elliptical, not definitely localized on the leaf, and up to 1/4 inch in diameter. This type of spotting occurred frequently on the cotyledons and lower leaves of plants, and was often associated with basal leaves which were turning yellow, although the basal yellowing occurred in many fields where no leaf spotting was found. Alternaria sp. grew from diseased leaves when plated but no recognized leaf pathogens were recovered. Leaf lesioning apparently due to non-parasitic disorders was found in plots at Winnipeg, Morden, Brandon and Portage la Prairie. Some leaves appeared "scorched" at the tips or edges; others developed chlorotic and necrotic spots and streaks, generally accompanied by chlorosis of the terminal portion of the plant, and often by stunting.

TOP BROWNING AND BOLL BLIGHT. A sample of diseased fibre flax was received early in July from M.F. Clarke, Experimental Farm, Agassiz, B.C. The terminal parts of the affected plants were brown and withered, with the leaves, flowers and bolls dead and dry. The disorder developed rapidly in late June and early July, in a crop sown on sod, and beginning to suffer from lack of moisture. Tall, vigorous plants as well as short, stunted ones were affected. Colonies of Alternaria and Hormodendrum spp. grew from plated stem tips; very few colonies developed from the bolls.

In Man. boll blight was found in the plots at Winnipeg on August 7. Bolls affected early in their development remained small, turned brown, and died without producing any seeds. Most of the blighted bolls were smaller at maturity than healthy ones, and contained only one or two small, thin seeds. Affected bolls were brown and dry when normal ones were still filling, and had not yet started to turn colour. The seeds in some severely diseased bolls were extremely thin and light, and were dull and discoloured. The pedicels immediately below diseased bolls were brown, withered and brittle; many affected bolls abscissed, leaving the dry brown pedicel. Test plots examined at Morden, Aug. 10, had few blighted bolls, but a large proportion of withered pedicels, up to 30% in some plots. Boll blight was severe in pasmo test plots, but it also occurred in variety test plots at Morden, independently of pasmo symptoms on the stems. The trouble was conspicuous in farm fields examined late in August; it was absent in 4 fields, light in 8, and severe (20 to 40%) in 15 out of 27 examined.

Brown discoloration of the pedicels and peduncles was severe in the variety plots examined at Brandon, Aug. 31, but it was not correlated with the severity of pasmo symptoms.

BROWNING AND STEM BREAK (Polyspora Lini) were not recognized in the field during the growing season. P. Lini was isolated, however, from volunteer flax seedlings collected in the variety test plots at Winnipeg, Oct. 10. Only two colonies of P. Lini were obtained, one from a lesioned cotyledon, and one from a hypocotyl. The seed for the test plots came from Ottawa (W.E. Sackston).

Note: Cultures of the Alternaria sp. isolated from browned bolls and pedicels by W.E. Sackston, were identified by J.W. Groves as A. tenuis.

Other Observations

ANTHRACNOSE (Colletotrichum Lini). A moderate infection was seen in fields of fibre flax, the seed of which received no treatment, in Kamouraska and L'Islet counties, Que. (R.O. Lachance).

WILT (Fusarium oxysporum f. Lini) caused severe damage in patches (tr-40% of plants wilted) in a field at Cayley and it was also observed in one other out of 9 examined in Alta. (W.C. Broadfoot). Diseased specimens were received from Mr. K.R. Hillier, Plant Products Division, who reported outbreaks of wilt at Seaforth, Mitchell and Tavistock, Ont. (J.J. Miller).

Nearly half of the experimental plots of the Station and Laboratory at Ste. Anne de la Pocatiere, Que., were destroyed due to excessive rain in the early part of the season. These plots were on ill-drained clay soil. The damage was apparently caused largely by wilt, for other crops did well in adjacent plots. Specimens of wilted fibre flax were also received from Vandrieuil-Soulonges district (R.O. Lachance).

RUST (Melampsora Lini). Infection was slight to moderate in 6 unirrigated fields in southern Alta.; it was also slight to severe in the plots at Lethbridge (W.C. Broadfoot).

Rust was only of very minor economic importance in Man. in 1945. Although present on flax throughout the province it occurred only in trace amounts in most fields and in several fields a considerable search failed to reveal its presence. The low incidence of flax rust this year can be attributed to the decrease in the acreage of the somewhat susceptible variety Redwing, the almost complete elimination of the very highly susceptible variety Bison, and the increased use of the resistant variety Royal and the immune variety Viking. That the light flax rust infections in 1945 were due to the use of resistant varieties rather than to unfavourable weather conditions was indicated by the amount of the disease that developed on susceptible varieties in field plots at Winnipeg, near to heavily rusted stubble from the 1944 crop. In these plots Bison and Redwing averaged 80 and 50% infection respectively (B. Peturson).

A trace to a very heavy infection occurred in a block of Cirrus in the Cereal Division plots, C.E.F., Ottawa, Ont.; only traces were observed on other varieties (R.G. Atkinson). Infection was slight in 2 fields and moderate in one out of the 4 examined in the Ste. Martine district, Que. (T. Simard).

STEM BREAK and BROWNING (Polyspora Lini). From some Manitoba-grown flax affected by pasmo sent by J.E. Machacek in Nov. 1943 both Septoria linicola and Polyspora Lini were isolated (T.C. Vanterpool).

FOXTAIL MILLET

SMUT (Ustilago Crameri). A single affected head was received from C.W. Buchanan, Agricultural Representative, who reported a heavy infection in a field at Napanee, Ont. (D.B.O. Savile).

MANGEL

CROWN GALL (Agrobacterium tumefaciens). A severely affected root was brought to the Laboratory, Charlottetown, P.E.I. (R.R. Hurst).

LEAF SPOT (Cercospora beticola) slightly affected Long Red in the plots at Agassiz, B.C. (W. Jones). A moderate infection was observed about Guelph, Ont. (J.D. MacLachlan).

BLACK LEG (Phoma Betae) was fairly general as a leaf spot in one field at Ladner, B.C. (W. Jones). Infection was moderate on the leaves, and slight on the seed stalks and crowns of a few plants on a seed crop of Tip Top in the plots of the Division of Forage Crops, C.E.F., Ottawa, Ont. (R.G. Atkinson).

LEAF SPOT (Ramularia beticola) caused slight damage to the leaves of Yellow Intermediate in the University plots, Vancouver, B.C. (W. Jones).

MOSAIC (Beta virus 2). A trace was found in 2 plots at the Station, Fredericton, N.B. (D.J. MacLeod).

FASCIATION (? Corynebacterium fascians (Tilf.) Dowson). Three plants were found affected in a seed plot at the Station, Fredericton, N.B.; all attempts to transmit the condition to healthy mangels by grafting were unsuccessful (D.J. MacLeod).

SUGAR BEET

A short report on the "Diseases of Sugar Beets in southwestern Ontario in 1945" was contributed by Dr. A.A. Hildebrand, Dom. Laboratory of Plant Pathology, Harrow, Ont.

In the sugar beet growing area of southwestern Ont., two diseases were of economic importance in 1945, namely BLACK ROOT (various fungi) of seedlings and RHIZOCTONIA ROOT ROT (R. Solani) which attacks the beets later in the growing season. Regardless of how environmental conditions may vary from season to season the area affected by blackroot remains fairly constant at about 800 acres. Consequently, when the total acreage of beets declines, as has been the case during the past two years, the losses caused by this disease become proportionately more important as a limiting factor in production. The incidence of blackroot and rhizoctonia rot has been found to be highest on the heavier, more closely compacted soil types that lack organic matter.

As in the past several years CERCOSPORA LEAF SPOT (C. beticola) was serious in only a few fields and could not be regarded as of economic importance.

Other Observations

LEAF SPOT (Cercospora beticola) was moderate about Guelph, Ont. (J.D. MacLachlan).

DAMPING OFF (Rhizoctonia Solani) caused a moderate infection of young plants at Lakeland, Man.; the plants were girdled just below the soil line and the fungus was abundant in the host tissues (J.E. Machacek).

RUST (Uromyces Betae) was general on the foliage at the Station, Saanichton, B.C. on Jan. 8, 1946. Fresh uredinial pustules were common. Rust was also prevalent throughout the fall and caused slight damage. (W. Jones).

ARGENTINE RAPE

WHITE RUST (Cystopus candidus). A slight scattered infection was general in the Morden area, Man. (W.L. Gordon).

STEM ROT (Sclerotinia sclerotiorum). About 40% of the plants were dead in a field at Portage la Prairie, Man. Sclerotia were abundant on the stems (J.E. Machacek).

BLACK ROT (Xanthomonas campestris) was present in the leaves of a few plants from the Morden area, Man. (W.L. Gordon). Specimens of Argentine rape bearing bacterial lesions were examined. The lesions were chlorotic and characterized by a darkening of the veins as in black rot of cabbage. The causal organism was isolated and identified as Xanthomonas campestris. It was compared pathogenically with cultures from cabbage and turnip. No evidence of specialization was found. Cultures from the 3 hosts caused infection on broccoli, Brussels sprouts, cabbage, cauliflower, kohl rabbi, radish, Argentine rape, and swede turnipe (W.A.F. Hagborg).

HEAT CANKER (high temperature). A condition similar to that in flax was seen in a field at Portage la Prairie, Man., on Aug. 30. The injury is believed to have occurred during a severe 2-day heat wave in late July (J.E. Machacek).

SAFFLOWER

ROOT ROT (? Fusarium spp.) resulted in the death of about 3% of the plants in the plots at Lethbridge, Alta.; species of Fusarium were isolated, but their pathogenicity has not yet been tested (M.W.C.).

RUST (Puccinia Carthami). Infection was moderate in the plots at Lethbridge, Alta., in late August (M.W.C.).

SOYBEAN

The account on "Soybean Diseases in Southwestern Ontario in 1945" presented below was prepared by Drs. A.A. Hildebrand and L.W. Koch, Dom. Laboratory of Plant Pathology, Harrow, Ont.

Both in 1943 and 1944 soybeans in southwestern Ont. were harvested under dry and otherwise almost ideal weather conditions, as a result of which they went into storage with a very low moisture content. This circumstance probably as much as any other accounts for the fact that during the past two growing seasons incidence of disease in this crop has been relatively low in the district.

BACTERIAL BLIGHT (Pseudomonas glycinea). First noted early in July, the disease was then continuously seen throughout the season in most of the fields visited. Only in a few plantings on Pelee Island, however, was infection severe enough to reduce the yield through defoliation. Of the 2 varieties grown on the island, namely, A.K. Harrow and Harman, the former was much more severely infected than the latter.

BROWN SPOT (Septoria Glycines). During an examination of plants in the Laboratory plots on July 3, reddish brown spots were noted near the base of the plants on the unifoliate or first true leaves and, in a few cases, on the lower trifoliate leaves. By the symptoms (and later by isolations from affected material) the disease was diagnosed as brown spot. A close examination of varieties in the plots revealed Earlyana to be apparently the most susceptible, Richland, Lincoln and A.K. Harrow to be intermediate, and Harman and a new, as yet unnamed, selection designated Harrow A to be least susceptible. A more extensive survey revealed that infection of the unifoliate leaves was universal throughout the district. In no case, however, was infection found to have spread beyond a few of the lower trifoliate leaves, and accordingly, when the pair of first true leaves dropped off, the disease virtually disappeared. Infection was as prevalent among plants originating from seed treated with various seed protectants as among those developing from untreated seed. Circumstantial evidence suggested that infection of lower leaves originated from splashings from the soil.

BUD BLIGHT (virus of the tobacco ring-spot group), the first authentic cases of which were noted about mid July, was not as prevalent as last year. However, if the disease should be seed-borne, as is soybean mosaic, the number of infected plants was still sufficient to constitute a potential source of danger in seed to be planted in 1946.

MOSAIC (Soja virus 1), though not abundant, was much more prevalent than last year. As in previous years Manchu varieties seemed to be especially susceptible to this disease.

DOWNY MILDEW (Peronospora manshurica). Although in 1944 not a single case of downy mildew was encountered, this year the disease was fairly widespread and abundant especially on Richland and A.K. Harrow. In 1943 the Harrow Laboratory reported to the Survey (P.D.S. 23:30) that in certain plants infected with mildew, infection, instead of producing the more typical scattered spots on the leaf, involved the whole under-leaf surface, producing symptoms of the mottle type that could be easily mistaken for mosaic. This year among the approximately 13,000 plants of the variety A.K. Harrow grown in the laboratory experimental plots, 8 plants showed the type of symptom referred to above. Attention was first attracted to these plants by the gray-green colour and mosaic-like appearance of their upper leaves. The plants were marked in the rows as soon as noted and kept under almost daily observation. After an interval of a week to ten days, Peronospora manshurica was found fruiting abundantly on the lower surface of the lower leaves of each plant. Later the fungus was found fruiting on the lower surface of the leaves midway up the stem and finally on those at the tip of the plant. On the latter, both the mottle and the rugose effect were due to the occurrence of "green islands" within which the fungus, though it may have been present, did not sporulate. What is of outstanding interest and importance is that these 8 plants became centres of infection within the plots. Direction and extent of infection were correlated with wind direction and velocity. It is believed that infection of these 8 plants originated from the seed and became completely systemic.

FUSARIUM BLIGHT (Fusarium oxysporum f. tracheiphilum), though fairly widespread in its occurrence, was not concentrated in any particular area and was unimportant in its effect on yield.

POD and STEM BLIGHT (Diaporthe Phaseolorum var. Sojae). Throughout most of the district this disease was only of sporadic occurrence. However, in a few fields on the heavier soils in Kent Co., infected plants amounted to 3% of the stand. The loss in yield due to the incidence of the disease is not so important as the possible contamination of seed to be used next year.

PHYLLOSTICTA LEAF SPOT (P. sojaecola). This year, as in 1944, Phyllosticta leaf spot was noted on the lower leaves of plants for a short time in the earlier part of the season, after which time it entirely disappeared.

FROG-EYE (Cercospora sojina) continues year after year to appear only on the stems of plants that have reached maturity, and apparently has little or no effect on yield.

Other Observations

DOWNY MILDEW (Peronospora manshurica). A slight infection was present on Black Eye in a garden in Agassiz, B.C. (W. Jones).

BACTERIAL BLIGHT (Pseudomonas glycinea) was recorded as follows: slight infection in 2 rows of Black Eye at Agassiz, B.C. (W. Jones); slight infection in the plots at Lacombe, Alta. (M.W.C.); trace to slight infection only on Mandarin, Kabatt and Pagoda in the plots, Division of Forage Crops, C.E.F., Ottawa, Ont. (R.G. Atkinson). The disease has been seen for several years in the plots at Charlottetown, P.E.I. (R.K. Hurst).

CURLY TOP (Beta virus). A 25% infection was found in one lot of soybeans in the verification plots at Summerland, B.C. (G.E. Woolliams).

MOSAIC (virus) affected 5% of the plants of Black Eye in a garden at Agassiz, B.C. (W. Jones).

SUNFLOWER

POWDERY MILDEW (Erysiphe Cichoracearum). A light to moderate development of the oidial stage was present on a specimen received from Mont Rolland, Que. (I.L.C.).

DOWNY MILDEW (Plasmopara Halstedii). A number of severely stunted, rosetted plants of Mammoth Russian was found in the crop on unrotted muck soil at the Station, Kapuskasing, Ont.; the germination was also poor. Only a trace of infection was present on the lower leaves when the same variety was grown in a rotation (R.G. Atkinson).

WILT (Sclerotinia sclerotiorum). A slight infection occurred in a planting at Fort Garry, Man., but a third of the plants were broken over and rotted in a planting at Pleasant Home (W.L. Gordon).

MOSAIC (virus). Nine plants of Mennonite at the Station, Fredericton, N.B., showed a striking yellow veinal mottling and a slight ruffling of the leaves; the plants were also slightly dwarfed. The virus was transmitted to healthy sunflowers by grafting (D.J. MacLeod).

BORON DEFICIENCY was slight in a plot of Mennonite at the Station, Fredericton, N.B. Streaking and cracking of the stem and petioles were noticeable in some plants on one side of the plot (D.J. MacLeod).

CULTIVATED GRASSES

Some records are here included on grasses not in cultivation where they belong to genera containing cultivated species.

AGROPYRON - Wheat Grass

Leaf Spot (Ascochyta graminicola) was present on faded leaves of A. trachycaulum along with Phyllachora graminis in the University area, Fort Garry, Man.; spores mostly 17.5-20 x 5 microns (W.L. Gordon).

Ergot (Claviceps purpurea) was present on A. repens in patches in the University area, Fort Garry, Man. (A.M. Brown). It was common along the dykes at Starrs Point, N.S. (J.F. Hockey).

Leaf Blight (Fusarium dimerum). The fungus was sporulating profusely on the odd blighted leaf in a patch of A. Smithii at Fort Garry, Man. (W.L. Gordon).

Powdery Mildew (Erysiphe graminis). Trace to moderate infections occurred on leaves of A. repens at Fort Garry, Man. (W.L. Gordon).

Tar Spot (Phyllachora graminis) was prevalent on the leaves of A. trachycaulum in a clump of the grass at the University, Fort Garry, Man. (W.L. Gordon).

Stem Rust (Puccinia graminis). Uredinia of P. graminis var. Tritici were present on a patch of A. trachycaulum var. typicum at Fort Garry, Man. (A.M. Brown, T. Johnson). A moderate infection occurred at Cypress River (T. Johnson). Infection was moderate to heavy on a thick stand of A. repens in a small block of Garnet wheat on a farm near Ottawa, Ont. (R.G. Atkinson).

Leaf Rust (Puccinia montanensis). A moderate infection of both P. montanensis and P. graminis was present in a plot of A. trachycaulum var. unilaterale at Brandon, Man. (T. Johnson).

AGROSTIS - Bent Grass

Leaf Rust (Puccinia coronata) was collected on A. alba at Fort Garry, Man., Sept. 27, 1944. Germinating telia were suspended over leaves of Rhamnus alnifolia on June 4 and resulted in pycnia on June 14 (A.M. Brown).

BRACHYPODIUM

Stem Rust (Puccinia graminis var Phlei-pratensis). A moderate infection was more or less general in a plot of B. pinnatum at Morden, Man. When the uredinia were cultured it proved to be var. Phlei-pratensis. The grass is thus a new host for timothy rust (T. Johnson).

BROMUS - Brome Grass

Leaf Spot (Ascochyta ?graminicola). A trace of infection was found on blighted leaf tips of B. inermis at Hargrave, Man. Pycnidia about 100 microns in diam. with pore; spores somewhat irregular in size and shape, many still continuous, 8.7-15 x 3-4 microns (W.L. Gordon).

Ergot (Claviceps purpurea) was common on volunteer B. inermis in the University area, Fort Garry, Man.; sclerotia were beginning to form on July 26 (A.M. Brown).

Leaf Blotch (Helminthosporium Bromi). A trace was present on B. inermis at Elm Creek, Man., and moderate spotting on some leaves at Starbuck (W.L. Gordon).

Leaf Rust (Puccinia coronata). A moderate infection on B. sp. (Ottawa 1927-449) in a plot at Brandon, Man., when cultured, proved to be variety Avenae (T. Johnson).

Stem Rust (Puccinia graminis). Slight infection on B. condensatus and B. marginatus in a plot at Brandon, Man.; when cultured both proved to be var. Avenae (T. Johnson).

Scald (Rhyncosporium Secalis). Infection slight in the plots of B. inermis at Lacombe, Alta. (M.W.C.); infection slight on B. inermis at Melita and moderate on some leaves at Gilbert Plains and Jordan, Man., spores 12.5-17.5 x 2.5-5 microns (W.L. Gordon).

Leaf Spot (Selenophoma bromigena). Common and often severe on plots of B. inermis at Saskatoon and Melfort, Sask. (H.W.M.); out of 16 collections of leaf spots on B. inermis made in Man. 11 yielded S. bromigena alone or with other organisms; infection varied from slight to severe (W.L. Gordon).

CALAMOVILFA

Rust (Puccinia amphigena). Infection severe on C. longifolia at Carberry, Man. (T. Johnson).

DACTYLIS GLOMERATA - Orchard Grass

Powdery Mildew (Erysiphe graminis). Odd scattered leaf affected in a field at the Auld Farm, O.A.C., Guelph, Ont. (J.D. MacLachlan).

? Purple Leaf Spot (Mastigosporium rubricosum). Infection common on early spring growth at Saanichton, B.C.; damage slight (W. Jones).

Brown Stripe (Scoletotrichum graminis). About 15% of the leaves were distinctly injured in a field at the Auld Farm, O.A.C., Guelph, Ont. Some of the leaves showed long indefinite dead stripes but only in a few areas was the fungus fruiting (J.D. MacLachlan, I.L. Conners). A slight infection on Hercules in the plots of the Division of Forage Crops, C.E.F., Ottawa (R.G. Atkinson).

ELYMUS

Ergot (Claviceps purpurea). Slight infection on a clump of E. Macounii at the University, Fort Garry, Man. (W.L. Gordon).

FESTUCA

Ergot (Claviceps purpurea). A trace in the plots at Olds, Alta. A moderate infection on a 1/3rd acre block of F. rubra variety Duraturf at the C.E.F., Ottawa, Ont. (R.G. Atkinson). Ergot affected 35% of the panicles of F. rubra var. Refon at one end of the range and 10% over the rest in the plots, O.A.C., Guelph, Ont. (J.D. MacLachlan).

Leaf Spot (Helminthosporium dictyoides). Infection general but slight on F. pratensis var. Mefon in the plots, O.A.C., Guelph, Ont.; fruiting on the basal leaves (J.D. MacLachlan).

Rust (Puccinia coronata). Uredinial infection general but mild on Mefon in the plots at Guelph, Ont. (J.D. MacLachlan). Infection varied from 5 to 40% on F. pratensis var. Ensign in the plots, C.E.F., Ottawa, Ont. (R.G. Atkinson).

Brown Stripe (Scoletotrichum graminis). Infection slight on F. rubra var. Duraturf in the plots, C.E.F., Ottawa, Ont. (R.G. Atkinson).

HOLCUS LANATUS

Twist (Dilophospora Alopecuri). Common in some areas on Lulu Island, B.C. (W. Jones).

HORDEUM

Stem Rust (Puccinia graminis var Tritici). Odd stems of H. brevisubulatum heavily infected at Morden, Man. (T. Johnson).

KOELERIA CRISTATA

Stem Rust (Puccinia graminis). Slight infection in a plot at Mordon, Man. (T. Johnson).

Rust (Puccinia monoica). Light infection at Wawanesa, Man. (T. Johnson).

LOLIUM

Ergot (Claviceps purpurea). Fairly general in one field of L. perenne at Ladner, B.C. (W. Jones).

Leaf Spot (Helminthosporium siccans). Infection general but slight on L. perenne var. Peron in the plots, O.A.C., Guelph, Ont.; sporulating on the older basal leaves (J.D. MacLachlan).

Eye Spot (Ovularia Lolii). Fairly general on L. italicum and L. perenne, causing moderate damage to the foliage of the latter at Saanichton, B.C. (W. Jones).

PHALARIS

Ergot (Claviceps purpurea). Trace in canary seed (P. canariensis) in the plots at Lacombe, Alta. (M.W.C.).

PHLEUM PRATENSE - Timothy

Root Rot (low-temperature basidiomycete). Plants were killed in small patches in an old alfalfa field at Lacombe, Alta.; the pathogen was isolated (M.W. Cormack).

Leaf Spot (Heterosporium Phlei). Infection moderate to severe in 2 fields in west-central Alta. (M.W.C.). Infection was slight to moderate on Medon, a hay type, and generally prevalent on Paton, a pasture type, but causing few leaves to collapse at the Auld Farm, O.A.C., Guelph, Ont. When leaves bearing the characteristic spots of the disease were incubated over night, the fungus sporulated sparingly (J.D. MacLachlan, I.L. Conners).

In surveys conducted in the Montreal district, Que., unidentified leaf spots were found causing a slight infection in 10 out of 24 fields in June, while the infection was slight in 21 fields and moderate in 11 out of 35 visited in July (T. Simard).

Stem rust (Puccinia graminis var. Phlei-pratensis) moderately infected some clumps in the University area, Fort Garry, Man. (A.M. Brown). Infection was slight in 5 fields and moderate in one out of 35 visited in July in the Montreal district, Que. (T. Simard).

Brown Stripe (Scolotrichum graminis). A slight infection was present on both Medon and Paton timothy in fields at the Auld Farm, O.A.C., Guelph, Ont. (J.D. MacLachlan).

POA

Stem Rust (Puccinia graminis). Odd stems of P. glaucifolia and P. nevadensis were heavily rusted in a plot at Mordon, Man. When the rust was cultured, the variety Avenae was obtained (T. Johnson).

Brown Stripe (Scolotrichum graminis). Infection was a trace on P. pratensis var. Kenon, but it was moderate to severe on P. canadensis var. Canon in the plots at O.A.C., Guelph, Ont. (J.D. MacLachlan).

LAWNS and GOLF COURSES

Snow Mould (low-temperature basidiomycete). The mycelium which developed on lawns and golf greens in the early spring in Alta., was mainly superficial and caused relatively little damage in 1945 (M.W.C.). Snow mould was of no importance on lawns at Saskatoon, Sask., this year (T.C. Vanterpool).

Brown Patch (Rhizoctonia Solani). Rather extensive areas were present on June 29 in a lawn containing a high percentage of Colonial Bent at St. Catharines, Ont. (G.C. Chamberlain).

Dollar Spot (Rhizoctonia sp.) was observed on several golf courses in 1945 in Ont.; some of the greens were badly disfigured (J.E. Howitt).

III. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

ROOT ROT (Fusarium oxysporum). Two plants were severely affected by a root rot and yellowing at Lethbridge, Alta. Isolations yielded a Fusarium resembling F. oxysporum (W.C. Broadfoot). Seedling plants affected with root rot caused by a Fusarium were found in Lincoln Co., Ont., in 3 separate plantings, the seed for which was obtained from the same source. Some 30-50% of the seedlings were affected but there was considerable recovery as new shoots arose from the crown (G.C. Chamberlain).

RUST (Puccinia Asparagi). A general slight infection was found in a 2-acre field grown for canning purposes at St. Amable, Que. (E. Lavallee). A slight infection was seen at Beaumont (R.O. Lachance).

BEAN

GREY MOULD (Botrytis cinerea). A slight infection was found on the leaves of Masterpiece at the Farm, Agassiz, B.C. (W. Jones).

ANTHRACNOSE (Colletotrichum Lindemuthianum). A slight infection occurred in some varieties in the plots at Lacombe, Alta. (M.W.C.). A severe infection was observed on the green pods in a planting in Man.; spores, probably immature, 11.2-17.5 x 4-6 microns (W.A.F. Hagborg, W.L. Gordon). Anthracnose was observed in gardens and bean fields throughout Ont. in 1945 and it caused considerable loss to growers of snap beans (J.E. Howitt). A slight infection was present in field beans in the Guelph district, Ont. (J.D. MacLachlan).

Anthracnose was found in a field at St. Pie, Bagot Co., Que., and a second at Stanbridge East, Missisquoi Co. The disease is apparently becoming less prevalent than bacterial blight (E. Lavallee). Of 3 fields in the Montreal district, infection was a trace in 2 and 20% in a third (R.O. Lachance). Anthracnose affected 3-45% of the pods in the variety plots, Fredericton, N.B. (S.F. Clarkson). An outbreak of anthracnose caused severe damage in a market garden, Charlottetown, P.E.I. (R.R. Hurst).

ROOT ROT (Fusarium Solani f. Phaseoli). A few plants were affected in the plots at Agassiz and the University, Vancouver, B.C.; the organism was isolated. This is the first time the disease has been observed in the coastal section of B.C. (W. Jones). Fusarium was frequently isolated from the stems and roots of navy beans bearing sclerotia of Macrophomina Phaseoli from Kent Co., Ont. (J.J. Miller).

CHARCOAL ROT (Macrophomina Phaseoli). An examination of 16 fields of navy beans about Chatham and Ridgetown, Ont., revealed sclerotia of M. Phaseoli to be abundant on plants growing in fields on dry sandy soil but it was not found in those on heavy clay soil. Up to 80% of the plants were infected in the warm sandy soils. In a field with both north and south slopes, far more infected plants were found on the south slope than the north. (A.A.

Hildebrand, L.W. Koch, J.J. Miller). This disease was encountered on soybean in 1944 (P.D.S. 24: 32). In an extended study of charcoal rot in soybean, A.A. Hildebrand, J.J. Miller and L.W. Koch (Sci. Agric. 25(11): 690-706. 1945), found the fungus to be a facultative parasite of soybean and identified the organism parasitizing the host as M. Phaseoli (I.L. Conners).

HALO BLIGHT (Pseudomonas medicaginis var. phaseolicola) was general in a few rows of Round Pod Kidney Wax in the trial plots at the University, Vancouver, B.C. (W. Jones). A moderate infection was observed in a planting at Vivian, Man. (J.E. Machacek). Halo blight was common in snap beans in Man. The causal organism was isolated from 3 collections. Plantings of Calapproved (California Certified) beans remained free from bacterial infection throughout the season except in a few plantings where a trace of infection may have spread from nearby diseased beans (W.A.F. Hagborg). Up to 90% of the plants were affected in some plantings of snap beans in Essex Co. Ont.; the damage was severe (L.W. Koch). A moderate to heavy infection was noted on the leaves of almost every plant in a block of Corvette in the Cereal Division plots, C.E.F., Ottawa, Ont.; scattered pods were lightly and moderately affected (R.G. Atkinson).

BACTERIAL BLIGHTS (Pseudomonas medicaginis var. phaseolicola and Xanthomonas phaseoli). Infection, mostly by halo blight, was much lighter than usual in central Alta. The damage was severe in southern Alta., especially on Round Pod Kidney Wax grown for canning. Infection was slight to moderate on most varieties in the plots at Lacombe. Seed obtained from California (Calapproved) and from the Kamloops district, B.C., in 1945 gave disease-free plants at Edmonton, Lacombe and Olds (L.E. Tyner). Severe halo blight infection was found at Edmonton and Red Deer (A.W. Henry). Out of 11 fields examined in the Montreal district, Que., infection was nil in 3, trace in 2, 5-20% in 3 and 40-50% in 3 (R.O. Lachance).

CANKER (Rhizoctonia Solani) heavily infected string beans and caused severe damage in a garden at Charlottetown, P.E.I. The cankers appeared both above and below ground and caused the death of some plants (R.R. Hurst).

STEM ROT (Sclerotinia sclerotiorium) caused slight damage to Bountiful at Lacombe, Alta. (M.W.C.).

RUST (Uromyces appendiculatus). A trace infection was noted in a planting in Queens Co., P.E.I. (R.R. Hurst).

BACTERIAL BLIGHT (Xanthomonas Phaseoli). Infections of moderate severity were noted in several gardens in Winnipeg, Man.; the causal organism was isolated from 2 collections (W.A.F. Hagborg). Infection was slight to heavy on the leaves and pods of nearly all plants of Corvette field bean in the Cereal Division plots, C.E.F., Ottawa, Ont.; the same variety was affected by halo blight (q.v.). Infection was moderate to heavy on the leaves and slight to moderate on the pods of Masterpiece, Pacer, Princess of Artois, Red Kidney Wax x Unrivalled Wax, Pole No. 1, and Ace in the plots of Division of Horticulture, while it was trace to

moderate on the leaves and pods of Pencil Pod Black Wax, Round Pod Kidney Wax, and Stringless Green Pod (R.G. Atkinson). Of the 5 fields grown for certification in the Montreal district, Que., two were absolutely free from blight and 5-10% of the plants were diseased in the other three. In the Three Rivers district 5 fields grown for seed were visited; 10-15% of the plants were affected (E. Lavallee). Bacterial blight infection varied from a trace to 60% in string beans in Queens Co., P.E.I. (R.R. Hurst).

CURLY TOP (Beta virus 1). From 10 to 50% of the plants grown in the verification plots, Summerland, B.C., were infected (G.E. Woolliams).

MOSAIC (virus). From 1 to 10% of the plants were affected in the verification plots, Summerland, B.C. (G.E. Woolliams). A few plants of the tapery bean (Phaseolus acutifolius var. latifolius) were affected by mosaic at the Botanical Garden, Montreal, Que., while the asparagus bean (Vigna sesquipedalis) was more severely diseased (J.E. Jacques). A trace of mosaic Phaseolus virus 1) was found in Kentucky Wonder, Stringless Landreth and Refugee Green Sensation in a test at the Laboratory, Fredericton, N.B. (D.J. MacLeod). An entire plot of Bountiful Green Pod was severely affected at Kentville, N.S. (J.F. Hockey). Traces of mosaic were seen in 6 gardens in Queens Co., P.E.I. (R.R. Hurst).

YELLOW MOSAIC (Phaseolus virus 2). A prominent yellow mosaic affected 1% of the plants of Flageolet in a test at the Laboratory, Fredericton, N.B. The virus was transmitted by sap inoculation to Pisum sativum, Trifolium hybridum and Phaseolus vulgaris, in all of which it produced a marked yellow mosaic. It was identified as Phaseolus virus 2 (D.J. MacLeod).

CHLOROSIS (lime induced) was severe on beans at Stony Mountain, Winnipeg, and Woodlands, Man. (J.E. Machacek).

SEED DECAY. Backward growing conditions caused early sown seed to remain dormant and finally decay in several gardens about Charlottetown, P.E.I. (R.R. Hurst).

BEET

SCAB (Actinomyces scabies). A slight infection was seen at Ste. Anne de la Pocatiere, Que. (R.O. Lachance), and a trace at Charlottetown, P.E.I. (R.R. Hurst).

LEAF SPOT (Cercospora beticola). Infection was fairly general and caused slight damage in gardens and on seed crops in the coastal region of B.C. (W. Jones). Most fields were slightly infected on Isle Jesus, Laval Co., Que. (E. Lavallee). Traces were present in the Station garden, Charlottetown, P.E.I. on Sept. 2 (R.R. Hurst).

DOWNY MILDEW (Peronospora Schachtii) was prevalent on stecklings at Ladner, B.C., and in the trial grounds of the University, Vancouver. A mild epidemic occurred at Duncan on Vancouver Island in late fall on stecklings intended for the 1946 seed crop. As the disease has not been found in the

latter district previously, it is believed that it was introduced on the seed from oospores in leaf debris. The seed had been dusted with Arasan according to the grower.

Stecklings which were grown in the Fraser Valley in 1944 and which became infected with downy mildew were kept in storage until January 1945. They were then planted in the greenhouse. Systemic symptoms of downy mildew developed on the foliage from the crowns. Mycelium of the fungus was present in old leaf petioles and crown tissue. Beet seedlings grown in flats in the greenhouse became infected with downy mildew when the plants were sprayed with a spore suspension. Growers have been repeatedly warned not to plant infected stecklings for seed production (W. Jones).

Downy mildew was present on May 31 in all beet fields planted for seed in the Grand Forks district, B.C. Affected plants were stunted and frequently failed to send up flower stalks. The fungus failed to sporulate on the non-flowering plants, but there were downy mildew lesions with spore production on the stem leaves on nearly all plants that produced flowering stalks. From 50-95% of the crop was affected. This is the first record of downy mildew on beets in the interior of B.C. and it seems probable that it was introduced into the district through infected seed. Later the disease was present on 2 beet seedlings out of 6 sent to the Laboratory from Grand Forks for examination (G.E. Woolliams).

Downy mildew of beet is a relatively new disease in North America. According to L.D. Leach (Hilgardia 6: 203-251. 1931), it was first observed in the United States in 1911 in the coastal districts of California, and the first severe outbreak in that state was in 1927. This disease is now known in all the Pacific Coast states and has been reported from the coastal section of B.C. since 1940 (P.D.S. 20:31). Leach presents clear evidence that P. Schachtii is transmitted by means of the seed, the incidence in commercial seed being usually under 0.2%. It is a destructive seed crop disease (I.L.C.).

LEAF SPOT (Phoma Betae). A moderate to very heavy infection occurred on nearly all plants in a lot of Detroit Dark Red being grown for seed by the Division of Horticulture, C.E.F., Ottawa, Ont. (R.G. Atkinson).

MOSAIC (virus). A trace was found in a plot at the Station, Fredericton, N.B., and in a garden at Bathurst (D.J. MacLeod).

BLACK MUSTARD

WHITE RUST (Cystopus candidus) severely attacked the leaves and caused them to die prematurely in the Botanical Garden, Montreal, Que. (J.E. Jacques).

BROAD BEAN

MOSAIC (virus) affected 8 plants (25%) in a small garden in Fredericton, N.B.; these plants matured early (D.J. MacLeod).

STREAK (cause undetermined). About 2% of the plants showed a severe dark streaking of the leaves, stems and pods in a garden at the Station, Fredericton, N.B.; the affected plants died early in the season (D.J. MacLeod).

POD BLACKENING (cause undetermined). Pods, leaves and even the stems of Dwarf Green Gem were severely blackened in the Botanical Garden, Montreal, Que. (J.E. Jacques).

BROCCOLI

BLACK LEAF SPOT (Alternaria oleracea) slightly infected Italian Green Sprouting broccoli at the Farm, Agassiz, B.C. (W. Jones).

STERILITY (virus). Two plants showed sterility in a garden in Fredericton, N.B. The seed cases were imperfectly formed and contained only a few viable seeds. The leaves presented a striking silvery appearance; later they developed a light purplish cast. Axillary shoots developed giving the plant the appearance of a witch's broom. Healthy broccoli plants grafted with scions from these plants developed similar symptoms. The virus seems to be similar to that causing sterility in turnip and wild radish (D.J. MacLeod).

CABBAGE

BLACK LEAF SPOT (Alternaria oleracea). A slight infection was present in April on overwintered plants set out for seed production at Dewdney, B.C. (W. Jones). Black leaf spot quite heavily infected a seed crop of Golden Acre in a greenhouse of the Division of Horticulture, C.E.F., Ottawa, Ont. Purplish lesions were present mostly at the base and crotches of seed branches causing the death of the branch bearing immature pods and flowers. Similar spots occurred on many pods and, on some, A. oleracea was fruiting. Greyish spots occurred on the leaves but may be due to the same fungus according to J.W. Groves. A moderate to heavy pod infection also occurred on all plants in a small seed plot of Danish Ballhead in August; undoubtedly the seed from the crop will be infected. A trace occurred in seed plants of Golden Acre in an adjoining plot (R.G. Atkinson). The pods of one plant were affected in a plot of seed plants at Ste. Clothilde, Chateauguay Co., Que. (R.O. Lachance).

YELLOWS (Fusarium conglutinans) affected 15% of a planting of 6000 plants of Burpee's All Head at Collingwood, Ont. (G.C. Chamberlain).

RING SPOT (Mycosphaerella brassicicola) was general on and caused moderate damage to plants set out in fall 1944 at Dewdney, B.C.; immature perithecia were present in April (W. Jones).

DOWNY MILDEW (Peronospora Brassicae). Infection was general and caused slight damage on overwintered plants in a garden in mid-February 1945 at Saanichton, B.C.; the fungus was sporulating freely (W. Jones).

BLACK LEG (Phoma lingam). Where seed was untreated, black leg took high toll in some fields of early cabbage in Essex Co., Ont.; mild cases were numerous (L.W. Koch).

CLUB ROOT (Plasmodiophora Brassicae) was general and caused severe damage in a ½-acre truck crop at Marpole, B.C. (W. Jones). Club root caused severe damage in one planting of Danish Ballhead in Queens Co., P.E.I. (R.R. Hurst).

SCLEROTINIA ROT (S. sclerotiorum) ruined one head out of 12 in a garden at Edmonton, Alta. (L.E. Tyner). A slight infection occurred in a seed crop of Golden Acre in a greenhouse, Division of Horticulture, C.E.F., Ottawa, Ont. (R.G. Atkinson). A heavy infection was noted in a lot of stored cabbage in Queens Co., P.E.I. on Nov. 30 (R.R. Hurst).

CARAWAY

Sclerotia of Sclerotinia sclerotiorum were found in a threshed sample of caraway seed (Carum Carvi) received from Isle Verte, Que. (O. Caron). The identity of sclerotia was established from cultures by J.W. Groves and by comparison of sections of the sclerotia with those of authentic material under the microscope (I.L.C.).

CARROT

BLACK ROT (Alternaria radicina). Little storage rot due to this organism was noted in the Interior of B.C. in the spring of 1945; the disease has been kept in check by the use of treated seed (G.E. Woolliams). Severe damage occurred in one lot of stored carrots at Edmonton, Alta. (L.E. Tyner).

GREY MOULD ROT (Botrytis cinerea) was present in small amounts in stored carrots in the B.C. Interior in March, 1945 (G.E. Woolliams). It caused severe damage to a bushel lot in storage in Queens Co., P.E.I. (R.R. Hurst).

LEAF SPOT (Cercospora Carotae) was fairly general in the Armstrong district, B.C.; in one field 25% of the stecklings showed infection on Oct. 15 (G.E. Woolliams).

SOFT ROT (Erwinia carotovora) caused a slight amount of loss in storage in the B.C. Interior in the winter of 1945 (G.E. Woolliams). Soft rot was very severe in winter carrots in Lincoln Co., Ont., this year; up to 50% of the roots were destroyed in some instances (J.K. Richardson).

SCLEROTINIA ROT (S. sclerotiorum). Affected specimens were received from Alfred, Ont. on Dec. 27 (H.N. Racicot).

BACTERIAL BLIGHT (Xanthomonas carotae). Infection was very slight on the seed crop in the Armstrong, Vernon, and Grand Forks districts, B.C., in 1945 (G.E. Woolliams).

YELLOWS (Callistephus virus 1) was virtually absent in the seed crop about Grand Forks, B.C.; the roots for this year's crop were carefully rogued by the growers, mainly as the roots were harvested in the fall of 1944 (G.E. Woolliams). Carrot seed said to have been grown in South America yielded in 1944 a very high percentage of plants showing symptoms typical of yellows. In an experiment in 1945, 35% of the plants from this seed were affected while in a control row 180 feet long from a different seed lot, planted 6 in. distant, 7.8% of the plants developed yellows, and in a row of the same "control" seed planted 150 feet distant, 1.3% became affected by yellows. A heavy population of leaf hoppers was present during August (G.B. Sanford). In 1944, carrot yellows was widespread and frequently severe in Sask. In 1945, no serious outbreaks were seen, infection being a trace and the symptoms appearing later than in 1944 (R.J. Ledingham). Only traces of yellows were present in the 6 varieties under test at the Station, Kapuskasing, Ont. Only a few scattered plants were likewise affected in the plots, Division of Horticulture, C.E.F., Ottawa, Ont. (R.G. Atkinson). A trace of yellows was seen at Ste. Clothilde de Chateauguay, Que. (R.O. Lachance). Yellows was general in fields in Carleton, Victoria, Madawaska, York, Queens, Sunbury and Westmorland counties, N.B.; infection ranged from a trace to 17%. In a seed plot at the Fredericton Station, 9% of the plants showed severe yellows, the plants being very weak and dying early in the season. The virus had overwintered in the stecklings. An additional 1% of the plants developed yellows late in the summer due to current season infection (D.J. MacLeod). The average infection of yellows was estimated to be under 5% in N.S. and in most fields inspected it was not more than 7% (J.F. Hockey). Yellows was noted in several gardens in Queens Co., P.E.I.; a 6% infection was recorded in one (R.R. Hurst).

HEAT INJURY was observed at Brandon, Man.; roots were killed at the soil level and the tops wilted (J.E. Machacek).

CAULIFLOWER

BLACK LEAF SPOT (Alternaria oleracea) was general on the pods in Snowball at Saanichton, B.C., in Sept.; it appeared after the weather became humid as the pods were approaching maturity (W. Jones).

GREY MOULD (Botrytis cinerea) severely infected a seed crop at Ste. Anne de Bellevue, Que.; it caused slight damage on account of a die-back of some branches of the inflorescence (R. Pelletier).

CURD ROT (Erwinia carotovora). Damage was severe in one seed crop and slight in 2 others about Victoria, B.C. (W. Jones).

CLUB ROOT (Plasmodiophora Brassicae). A trace was seen in a garden at Charlottetown, P.E.I. (R.R. Hurst).

Rhizoctonia Solani was isolated from plated seed at Saanichton from B.C. crop (I. Mounce).

WILT (Sclerotinia sclerotiorum) caused the loss of 50% of the plants in one seed crop at Victoria, B.C.; lack of rotation and overwatering may have contributed to its spread. Numerous seed plants were also killed late in the season at Saanichton (W. Jones).

?MOSAIC (virus). Moderate symptoms of mosaic were observed on cauliflowers at Edmonton, Alta. (A.W. Henry).

BROWNING (boron deficiency). An affected specimen was brought to the Laboratory from a commercial garden, in Queens Co., P.E.I. (R.R. Hurst).

CELERY

EARLY BLIGHT (Cercospora Apii). A heavy infection was present in a garden in Queens Co., P.E.I. on Sept. 16 (R.R. Hurst).

LATE BLIGHT (Septoria Apii-graveolentis) was reported as follows: infection general and damage moderate in truck gardens at Marpole, B.C. (W. Jones); a light infection in some of the late-planted fields at Kelowna and Armstrong (G.E. Woolliams); spots, profuse with pycnidia, common on stalks of celery purchased from a retail store at Winnipeg, Man.; spores 30-82.5 x 1-2 microns, mostly 50-72 x 2 microns (W.L. Gordon); damage slight in Essex Co., Ont.; less severe than in 1944 (L.W. Koch); outside leaves affected in all 3 fields inspected this fall at St. Martin, Laval Co., Que.; plants were dusted, but the weather was wet in late summer (E. Lavallee); quite serious about Quebec City, greatly reducing the return in some plantings (O. Caron); infection heavy in a garden in Queens Co., P.E.I., on Sept. 8 (R.R. Hurst).

MOSAIC (virus) was found at London, Ont., and in the Laboratory plots, St. Catharines, causing considerable stunting. The virus was probably Cucumis virus 1 (G.C. Chamberlain).

BLACK HEART (non-parasitic) was reported from several of the celery growing areas of Ont. (J.E. Howitt).

CUCUMBER

GREY MOULD (Botrytis cinerea) caused slight damage to Perry's Special in greenhouses in Essex Co., Ont. (L.W. Koch).

SCAB (Cladosporium cucumerinum) caused considerable damage to the greenhouse crop in Essex Co., Ont., through disfiguring and stunting a considerable number of the fruits (L.W. Koch).

BACTERIAL WILT (Erwinia tracheiphila) infected 2-3% of the plants in several plantings in the vicinity of Aldershot, Ont. It also affected about 10% of the plants in a small planting in Lincoln Co. (G.C. Chamberlain). In 3 fields inspected at St. Martin, Laval Co., Que., half the plants were infected. It is very probable that losses were also high in many other fields (E. Lavallee). Bacterial wilt caused the loss of about 30% of the plants in the variety test plots at Macdonald College (R. Pelletier). A slight infection was noted at L'Assomption (R.O. Lachance). A trace of wilt was present in a planting at Wolfville, N.S. (J.F. Hockey).

WILT (?Fusarium spp.). Infection was slight in a planting at Dauphin and moderate in one at Winnipeg, Man. (J.E. Machacek). Fusarium wilt affected 3-5% of the plants in several plantings of Longfellow in the Aldershot area, Ont. (G.C. Chamberlain).

ANGULAR LEAF SPOT (Pseudomonas lachrymans). Affected specimens were received from Evesham, Sask. Its determination was verified by W.A.F. Hagborg. This is the first time the disease has been reported in Sask. (R.J. Ledingham). The disease threatened to become severe on field cucumbers in Essex Co., Ont., during June; the onset of dry weather appeared to arrest its progress (L.W. Koch).

MOSAIC (Cucumis virus 1) appeared near the end of the growing season in greenhouse cucumbers in Essex Co., Ont.; it affected up to 12% of the plants and caused moderate damage. Mosaic also affected up to 5% of the plants in field plantings and caused slight damage in the same area (L.W. Koch). Affected specimens were received from a greenhouse at London; it affected 5% of the plants in a field planting in Lincoln Co. and was observed causing slight damage in the plots at the Station, Vineland (G.C. Chamberlain, J.K. Richardson). All Everbearing plants were affected in varying degrees by mosaic in a plot at the Botanical Garden, Montreal, Que. (J.E. Jacques). A trace of mosaic was found on 2 farms in Sunbury Co., N.B. (D.J. MacLeod).

OEDEMA (over-watering). Affected plants were received from a greenhouse at Chelmsford, Ont. (H.N. Racicot).

POTASH STARVATION was very pronounced in warm greenhouses at Leamington, Ont., near the end of the season; the damage was moderate (L.W. Koch).

EGG PLANT

WILT (Verticillium Dahliae). All plantings observed in Lincoln Co., Ont., were infected in varying degrees, some of the more severely affected plants being killed outright (J.K. Richardson).

ENDIVE

DROP (Sclerotinia sclerotiorum) caused moderate damage in a planting adjacent to infected lettuce at Lacombe, Alta. (M.W.C.).

HOP

DOWNY MILDEW (Pseudoperonospora Humuli) was observed on cultivated hops at Agassiz and Sardis and on escaped hops along a roadside in North Saanich, B.C. Infection was severe on Clusters in one yard, both basal and terminal shoot infection being general. The disease was prevalent on all susceptible varieties early in the season. The Fuggles variety is still virtually free from infection under conditions in the Fraser Valley (W. Jones).

HORSE RADISH

WHITE RUST (Cystopus candidus). A severe infection occurred on plants where sprinklers were employed at the Botanical Garden, Montreal, Que. (J.E. Jacques).

LEAF SPOT (Ramularia Armoraciae) was common on escaped plants along ditches of truck gardens at Marpole, B.C. (W. Jones).

LEEK

GREY MOULD (Botrytis sp.) was general in a seed crop of leek at Brentwood, B.C., affecting the flower stalks and pedicels, and seed capsules, materially reducing the yield of seed. Air drainage was poor and refuse of last year's crop lay nearby (W. Jones).

LETTUCE

GREY MOULD (Botrytis cinerea). A slight infection developed on one crop being grown for seed at Grand Forks, B.C. (G.E. Woolliams).

DOWNY MILDEW (Bremia Lactucae) was general and caused moderate damage to New York and Cos in North Saanich, at the Farm, Agassiz, and the University, Vancouver, B.C.; in one plot the infection was heavier due to overhead watering (W. Jones).

DROP (Sclerotinia sclerotiorum) affected 10% of the seed plants of New York in a planting at the Farm, Agassiz, B.C. (W. Jones). The disease caused slight to moderate damage in gardens at Edmonton and in the plots at Lacombe, Alta. (M.W.C.). A moderate infection was present on New York in a planting at Dropmore, Man. (W.A.F. Hagborg, W.L. Gordon).

LEAF SPOT (Septoria Lactucae Pass.). Mr. W.C. Moore, Mycologist, Plant Pathology Laboratory, Harpenden, England, has drawn our attention to an error in last year's report (P.D.S. 24: 47). In his note in Trans. Brit. Myc. Soc. 24: 346-349, 350 (foot note), 1940, he shows that the correct authority for the binomial, Septoria Lactucae, is Passerini and not Peck. Material of Septoria Lactucae was distributed in Thümen's Mycotheca Univ. 1295 and in Erb. Critt. Ital. 746. The latter specimen was published in

Fasc. 15 in Oct. 1878. As Moore found that a description appears on the label almost identical with that accompanying the Thümen Mycoth. univ. specimen, S. Lactucae Pass., Oct. 1878 clearly antedates S. Lactucae Peck, June, 1879. Incidentally, S. Lactucae Pass. appears without a description in Atti Soc. Critt. Ital. 2: 34. 1879, erroneously cited by Saccardo, Allescher and others as the source of the original description. Moore also discusses additional synonyms (I.L. Conners).

YELLOWS (Callistephus virus 1) was severe in 4 gardens in York Co. and 2 in Sunbury Co., N.B. (D.J. MacLeod).

TIP BURN (high temperature). Head lettuce was badly scorched by heat at St. Vital, Man. (J.E. Machacek).

MELON

LEAF SPOT (Alternaria ?cucumerina) slightly affected melons in the Aldershot area, Ont. (J.K. Richardson).

SCAB (Cladosporium cucumerinum) caused slight damage to muskmelons in Essex Co., Ont. (L.W. Koch, J.J. Miller).

ANTHRACNOSE (Colletotrichum lagenarium) appeared later and caused less damage than usual in Essex Co., Ont.

BACTERIAL WILT (Erwinia tracheiphila). Not over 2% of the plants were affected in melon plantings in Essex Co., Ont.; authentic cases were fewer than usual (L.W. Koch). Several specimens were received from the Aldershot district, Ont.; it was said to be more prevalent than usual (J.K. Richardson). The disease affected about 5% of the melon plants in one field at Laval des Rapides, Que. (R. Desmarteau).

POWDERY MILDEW (Erysiphe Cichoracearum) caused moderate damage to muskmelon in one planting in Essex Co., Ont. (L.W. Koch, J.J. Miller).

FUSARIUM WILT (F. sp.). Up to 60% of the plants were affected in plantings in Essex Co., Ont.; it was the most serious disease of muskmelons in 1945 (J.J. Miller). From 10 to 15% of the plants were affected about Aldershot. In the past few years Fusarium wilt has ranked as the most serious problem of the grower in this important melon-growing area; many growers have suffered severe losses from the disease (J.K. Richardson).

SOFT ROT (Pythium ultimum). A few muskmelon fruit on the ground rotted at Saanichton, B.C.; the fungus was isolated and its pathogenicity proven by inoculation of melons and potato tubers (W. Jones).

MOSAIC (virus) caused only slight damage to melon in Essex Co., Ont.; it was nearly absent in some plantings (L.W. Koch).

ONION

PURPLE BLOTCH (Alternaria Porri) moderately affected 20% of the plants in a planting at Portage la Prairie, Man. (J.E. Machacek).

NECK ROT (Botrytis Allii) developed mostly on onions kept in common storage over winter in the B.C. Interior and caused losses amounting to 25% of the crop in some cases. Little neck rot occurred in onions kept in cold storage (G.E. Woolliams). Damage was moderate in several lots of onions in storage at Edmonton, Alta. (M.N.C.). Neck rot was apparently more prevalent than usual in onions in storage in Sask. in the winter 1944-45, for numerous specimens were received, but generally only serious in large onions of the Spanish type. Its unusual prevalence was probably due to the lack of good curing weather in the fall of 1944 (R.J. Ledingham). Neck rot infected up to 5% of the Spanish onions in plantings in Essex Co., Ont.; it appeared to be more severe where overhead irrigation was practised (L.W. Koch). Neck rot affected 10% of the white onions in a garden in Kings Co., N.S.; it was also observed on Yellow Globe (J.F. Hockey). Neck rot caused severe damage to imported onions at Charlottetown, P.E.I., in August and gave rise to many complaints (R.R. Hurst).

SMUDGE (Colletotrichum circinans) was causing slight damage to white onions received from Blenheim, Ont. (J.J. Miller).

SOFT ROT (Erwinia carotovora) caused slight damage to a $\frac{3}{4}$ acre planting of Spanish onions in Essex Co., Ont.; up to 4% of the onions were affected (L.W. Koch).

BULB ROT (Fusarium ?oxysporum f. Cepae). Some 25% of the bulbs were reported to be rotting in a planting at Portage la Prairie, Man. (J.E. Machacek).

DOWNY MILDEW (Peronospora destructor) was observed in 2 seed crops in coastal B.C. By roguing out the affected plants when first observed, then spraying first with soft soap solution, followed with Bordeaux after the plants were dry, the disease was held in check throughout the season at Saanichton. Spraying first with the soap solution insured excellent coverage. Moreover, the weather was dry and the protective film was not washed off. At Duncan, where the disease was well advanced when first seen, the grower sprayed the seed plants as advised, first with a soap solution, 4 lb. per 100 gal., and then with lime sulphur at summer strength. As a result, he harvested a fair crop (W. Jones). Downy mildew suddenly appeared in late June in the onion seed crop of several varieties at Grand Forks and Kelowna and threatened to become epidemic. Fortunately the weather turned hot and dry in early July; the disease ceased to spread and further development on the affected plants was arrested so completely that no secondary infection by Stemphylium botryosum appeared (G.E. Woolliams).

Downy mildew infection was severe in a planting at Baldur, Man. (J.E. Machacek). The disease was prevalent and destructive in the Thedford marshes, Ont. in 1945. (J.E. Howitt). Large spots of diseased onions could be seen in most of the 30 onion fields at St. Martin, Laval Co., Que., by Aug. 31. Downy mildew appeared to be causing more damage than usual, but the

amount was difficult to assess because of the general infestation by Thrips (E. Lavallée). Infection was slight in crops grown for seed at L'Assomption and Ste. Clothilde (R.O. Lachance).

LEAF SPOT (Pleospora herbarun (Stemphylium botryosun) caused moderate damage to flowering stalks of seed plants affected with downy mildew at Duncan, B.C. (W. Jones).

SMUT (Urocystis Cepulae) infected 75% of the plants and caused a loss of half the crop in a field at Cyrville, Ont. Onions were planted in the same field in 1944, when smut was also present and no treatment was attempted (L.T. Richardson). The number of fields infected by smut slowly increases each year in the Montreal district, Que. Three or four patches were found in a newly-discovered field at St. Léonard-Port Maurice, Laval Co. (E. Lavallée).

YELLOW DWARF (virus) was found in the Vernon and Lavington districts, B.C., on Yellow Globe Danvers. An occasional affected plant was present in some fields but 25% of the plants showed yellow dwarf in one field. This disease has not been previously reported in Canada (G.E. Woolliams).

PARSLEY

LEAF SPOT (Septoria Petroselini) was general and caused slight damage in one garden in North Saanich, B.C. (W. Jones).

PARSNIP

YELLOWS (Callistephus virus 1). A slight infection occurred in a planting at the Station, Fredericton, N.B. (D.J. MacLeod).

PEA

A brief report on "Pea Diseases in Northeastern Saskatchewan in 1945" has been prepared by Dr. H.W. Mead, Dominion Laboratory of Plant Pathology, Saskatoon, Sask.

The extensive pea-growing area around Nipawin, Codette and Aylsham, Sask., was surveyed during the week of Aug. 6. At that time the crop was green, with blossoms, young pods, and well-filled pods present. Most of the plantings seen were of field peas, Dashaway and Arthur being the commonest varieties. There was a smaller acreage of garden peas, including such varieties as Laxton's Progress and British Lion. In this area, 30 fields were examined and the following diseases were recognized:

MYCOSPHAERELLA BLIGHT (M. pinodes (Ascochyta pinodes) was present on every plant in all the fields; infection in most fields was slight to moderate chiefly on the lower two-thirds of the stems and leaves. In 18 of the fields, the organism caused extensive lesions at the base of the plants but affected very few pods. Blossom blight was found in 2 fields.

LEAF AND POD SPOT (Ascochyta Pisi) was found on stems and leaves in 10 fields and on pods in 4. Infection was very light. ROOT ROT (Rhizoctonia Solani) caused slight damage in one field and WILT (Fusarium spp.) was slight to moderate in 12.

The survey was notable on account of the common occurrence of Mycosphaerella Blight. Conditions in most fields were favourable for the further development of the disease, as the stand was heavy and the soil wet.

Pea growing has expanded greatly in the area in the last 5 years. Much of the seed is supplied by one grower, but a considerable quantity was shipped in by a line-elevator company. There has been no control of the seed supply to prevent the introduction of diseased seed. Harvesting is done by combine, the straw being spread on the ground. As far as known, most of the crop is grown on summer fallowed land with very little being grown on land in peas the previous year.

Of possible wild hosts, Vicia americana was found around most fields and Lathyrus venosus in a few.

A few fields in the Kelvington area in eastern Sask. were surveyed on Aug. 25. Mycosphaerella Blight was present lightly spotting the stems and leaves of Chancellor and Dashaway peas in these fields and very lightly spotting the pods in one. Typical spots of Ascochyta Pisi were seen in one field. In general the infection was much less severe in this area than in the Nipawin-Codette area. A light infection was also noted at Saskatoon (H.W.M.).

Of the 155 samples of pea seed chiefly Arthur, Dashaway and Chancellor from Sask. examined at Ottawa by Feb. 4, 1946, 131 were from the Nipawin-Codette area and 24 from other places. Of the 131 samples from this area 6 were considered suitable for seed, 47 contained some diseased seed and it was recommended that the seed be treated before sowing and 78 (or 60% of the samples) were classed as unfit because more than 2% of the seed was infected with one or more of the parasitic species of Ascochyta. Infection in these latter samples varied from 2 to 22% and averaged about 7%. Some samples also carried Fusarium spp., infection varying from 2 to 6%, and averaging 3%. Of the 24 samples from elsewhere in Sask., 4 were suitable for seed, 13 required seed treatment, and 7 (29%) were unfit. It is evident that the seed produced in the Nipawin-Codette area is much inferior to the small group of seed samples from elsewhere in Sask. (G.A. Scott).

Other Observations

LEAF and POD SPOT (Ascochyta Pisi). Infection was slight to moderate in several gardens at Edmonton, Alta., and slight in the plots at Lacombe (M.W.C.). A moderate infection was present on Tall Telephone, making the crop unsuitable for seed at L'Assomption, Que.; a trace was present on other varieties (R.O. Lachance). A 1-2% infection was observed on the pods of Fenland Wonder in a planting in Kings Co., N.S.; the damage was slight (J.F. Hockey). A trace of leaf spot was seen in a planting in Queens Co., P.E.I. (R.R. Hurst).

ANTHRACNOSE (Colletotrichum Pisi). Infection was moderate to heavy on stems and pods of Arthur foundation stock at the Central Experimental Farm, Ottawa, Ont. (R.G. Atkinson).

POWDERY MILDEW (Erysiphe Polygoni) caused a complete crop failure in garden peas in the Stanley area, York Co., N.B. (S.F. Clarkson).

WILT and ROOTROT (Fusarium spp.). Up to 100% of the plants were affected in some places in fields in Essex Co., Ont.; the damage was moderate (J.J. Miller). Fusarium rootrot was recorded in several fields about Guelph, Ont. It was severe in the test plots of the Minnesota Valley Canning Co., near St Marys; so far as it is known peas had not been grown in the fields before (J.D. MacLachlan). Wilt and rootrot was very severe, causing the death of many plants and very low yields, in the plots, Division of Horticulture, C.E.F., Ottawa; infection varied from 30 to 100% in Director, Engress, Kootenay, Laxanney, Laxton Progress, Linton, Onward, Radium, Swonder and Thomes Laxton, less severe in Zipper, 2% in Laxal and trace in Engton (R.G. Atkinson). Infection was severe in Arthur and the crop was nearly a complete loss in some fields at Ste. Anne de la Pocatière, Que. (R.O. Lachance)

BACTERIAL BLIGHT (Pseudomonas Pisi) slightly infected a planting of field peas at Sidney, Man.; it was less severe around the edge of the field (J.E. Machacek).

ROOTROT (Rhizoctonia Solani) caused slight damage in the plots at Lacombe, Alta. (M.W.C.).

LEAF SPOT (Septoria Pisi) was heavy in all Cereal Division plots, C.E.F., Ottawa, Ont. (D.B.O. Savile).

MOSAIC (Pisum virus 2). A trace was found in 2 gardens at the Station, Fredericton, N.B., and in a small field in Sunbury Co. (D.J. MacLeod). A trace occurred in Queens Co., P.E.I. (R.R. Hurst).

CHLOROSIS (lime-induced) was severe in a planting at Stony Mountain, Man. (J.E. Machacek).

INFECTIOUS CHLOROSIS (virus). A slight amount was seen at Vernon and Summerland, B.C. (G.E. Woolliams).

STREAK (Solanum virus 1, N strain). A severe strain of Solanum virus 1 was found in 2 plants, which developed streak in a garden in Sunbury Co., N.B. (D.J. MacLeod).

POTATO

The Plant Protection Division, Science Service, has supplied the data on the certified seed produced, the acreages of the leading varieties passing inspection, the number of fields that failed to pass inspection, and the average percentage of the diseases - black leg, leaf roll, and mosaic - found in the fields. All fields entered for certification are planted with foundation or foundation A seed.

Table 3: Seed Potato Certification
Number of Fields and Acres Inspected, 1945.

Province	Number of Fields		Fields Passed %	Number of Acres		Acres Passed %
	Entered	Passed		Entered	Passed	
P.E.I.	5,812	5,511	94.8	25,473	24,468	96.1
N.S.	265	251	94.7	603	577	95.7
N.B.	2,746	1,751	64.0	18,340	10,951	60.0
Que.	795	585	73.5	1,743	1,104	63.3
Ont.	796	735	92.3	2,270	2,117	93.2
Man.	103	61	59.2	274	178	64.9
Sask.	68	64	94.1	68	58	85.2
Alta.	176	146	82.9	320	251	78.4
B.C.	506	397	78.4	1,555	1,162	74.7
	11,267	9,501	84.3	50,646	40,866	80.7
Previous Yearly Totals						
1944	8,500	7,567	89.0	31,633	28,616	90.4
1943	9,562	5,520	57.7	34,947	19,148	54.8
1942	7,947	5,023	62.2	29,981	18,875	62.9
1941	9,813	6,404	65.3	37,668	24,405	64.8

Acres Entered		Acres Passed	
1944	31,633	1944	28,616
1945	50,646	1945	40,866
Increase of 19,013 or 60.1%		Increase of 12,250 or 42.8%	

Table 4: Seed Potato Certification: Acreage Passed by Varieties, 1945.

Variety	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.-Alta.	B.C.	Total
Green Mountain	8,331	57	3,992	1,023	78	3	44	13,528
Irish Cobbler	12,547	141	340	58	264	107	1	13,458
Katahdin	1,418	227	5,267	10	1,238		15	8,175
Sebago	2,135	92	71		89			2,387
Bliss Triumph		44	1,085			38		1,167
Netted Gem	4				4	244	728	980
Chippewa	2		37	8	356	1	3	407
White Rose							265	265
Warba		10	1		25	15	42	93
Houma	24		62		4		1	91
White Bliss			89					89
Rural New Yorker					50			50
Early Epicure						12	27	39
Other Varieties	7	6	7	5	9	67	36	137
TOTAL	24,468	577	10,951	1,104	2,117	487	1,162	40,866

Table 5: Seed Potato Certification: Fields Rejected on Field Inspection, 1945.

Province	Leaf Roll	Mosaic	Ring Rot		Black Leg	Adjacent diseased Fields	Foreign Varieties	Misc.	Total
			in field	on farm					
P.E.I.	59	30			23	27	62	100	301
N.S.	2				2	1	3	6	14
N.B.	793	2	85	64	2	18	8	23	995
Que.	20	5	69	32	27	12		45	210
Ont.	6	2	4		14	4	2	29	61
Man.	1		19	16	1			5	42
Sask.				2	1		1		4
Alta.	2			11	2	4	5	6	30
B.C.	48	10			4	20	3	24	109
TOTAL	931	49	177	125	76	86	84	238	1,766
Rejections as a percentage of fields:									
Entered	8.2	0.4	1.6	1.1	0.7	0.8	0.8	2.1	16%
Rejected	52.7	2.8	10.0	7.1	4.3	4.9	4.7	13.5	100%

Table 6: Seed Potato Certification: Average Percentage of Disease found in Fields, 1945.

Average percentage of disease found in	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
	%	%	%	%	%	%	%	%	%
Fields entered: (first inspection)									
Black Leg	.11	.09	.05	.23	.02	.15	.08	.14	.06
Leaf Roll	.32	.17	3.2	.18	.06	.06	.03	.11	.69
Mosaic	.11	.05	.2	.07	.01	.02	.03	.03	.21
Fields passed: (final inspection)									
Black Leg	.02	.04	.03	.07	.03	.04	-	.03	.02
Leaf Roll	.09	.08	.2	.08	.04	.03	.02	.08	.01
Mosaic	.04	.02	.03	.06	-	.01	-	.02	.05

As shown in Table 3, both the number of acres entered for certification and the number passing inspection were high in 1945; in fact, it was the greatest acreage entered since seed certification began. The percentage of acres passing inspection was, however, less than last year, although considerably higher than in recent years, when the fields eligible for certification needed only to be planted with certified seed.

Anyone familiar with seed certification is aware that the presence of mosaic and leaf roll above the amounts tolerated has accounted for upwards half of the rejections; less well known or understood was the continued freedom of some stocks, especially when virus diseases were absent or in extremely low

concentrations. As suggested last year (P.D.S. 24:52), the two factors responsible for the remarkable improvement in percentage of acres passing inspection were the greater freedom of the seed from virus diseases and the low aphid population in 1943.

A study of this year's figures shows a further decline in the rejections on account of mosaic below the low figures of last year. This decline suggests that if the amount of mosaic in the seed is below a minimum value this condition is more important than the aphid population to which the crop is currently exposed. On the other hand the sudden increase of leaf roll in N.B. in 1945, when it was responsible for almost 80% of all rejections as against 18% in 1944, points to rapid spread only accountable by fluctuations in the aphid population from year to year.

As over one-third of the acreage entered for certification is in N.B., the large number of rejections for leaf roll in that province sharply raised the national total for leaf roll rejections. On the other hand, rejections from other causes declined both absolutely and relatively. Bacterial ring rot continues to hold second place in certified seed; it was most serious in Man. where 35 fields out of 103 entered were rejected on account of ring rot occurring in the field or in other fields on the same farm.

COMMON SCAB (Actinomyces scabies) was found on several crops of smooth skin varieties, especially Katahdin, Warba and White Rose grown on the drier soils in the Caribou and the interior of B.C., but the loss from grading out affected tubers was probably about average (H.S. MacLeod). Less scab has been present than usual on smooth skin varieties in Alta. in the last 2 years. However, on bin inspection, 2 lots of Netted Gem grown in northern Alta. showed a high percentage of surface scab, which is uncommon in this variety (J.W. Marritt). The season was apparently favourable for scab in Sask., for several lots were so severely affected that grading would be unprofitable (A. Charlebois). Most crops showed a trace of scab in Man. and northwestern Ont. (D.J. Petty). Scab was slight in a field at Hartney and severe in one of Irish Cobbler at Winnipeg, Man. (W.L. Gordon). The disease was rather prevalent in central Ont., the season being apparently favourable for its development. In general, the crop was planted late under very wet conditions, while in August, temperature was high and rainfall slight or none. Many bushels of excellent Foundation seed could not be graded up to standard due to its presence (J.W. Scannell). Severely affected tubers were received from Sesikinika Lake (L.T. Richardson). Slight scab was present in many lots inspected in Que., but heavier infections than usual occurred in some districts, conditions being apparently more favourable as a result of dry weather during the growing season. Infection varied from 20 to 50% in fields where lime had been applied some time previously. Very scabby lots of table stock were observed on the markets at Quebec, Three Rivers, Shawinigan Falls, Grand' Mère, Joliette and Drummondville (B. Baribeau). No serious infections were reported in N.B. In districts where it is the practice to burn straw piles in the fields, it has been noted that potatoes grown the next year on the burned-over areas are affected with scab (C.H. Godwin). Scab was more common than usual in N.S.; it was found in 45% of the crops inspected and about 5% of the tubers were affected (W.K. McCulloch). Common scab was more or less prevalent in most sections of P.E.I.; some lots were quite severely

infected and were difficult to grade (S.G. Peppin). Scab was so severe in one lot of Green Mountain grown in 1944 that the entire bin was destroyed by secondary rots (R.R. Hurst).

EARLY BLIGHT (Alternaria Solani) was present in 15% of the fields inspected in B.C., infection being usually slight.

It was, however, severe in 2 fields and moderate in 12 (H.S. MacLeod). Infection was slight to moderate in several plantings at Edmonton, Alta. (M.Y.C.). Early blight was observed frequently, but it caused no apparent damage in Sask. (A. Charlebois, R.J. Ledingham). Recorded infection of early blight were: severe at Brandon and Carberry, Man., moderate at Darlingford and slight at Lakeland and Swan River (W.L. Gordon). Infection was slight in 25% of the fields in Man., moderate in one field at Brandon and severe in another at Glenbory. Infection was slight in most fields in the Thunder Bay District, Ont., with a moderate infection in the Upsala area. A slight to moderate infection was noted in a few fields in the Oxdrift area in the Kenora district. Several tubers were found affected at Dryden in the same district (D.J. Petty, J.E. Machacek). Some early blight developed at the first of the season in Ont., but infection remained slight (J.W. Scannell). Early blight was general in Que., but caused only slight damage to the crop. It was difficult to estimate because severe damage by flea beetles and leaf hoppers caused premature death of the vines (B. Baribeau). A few fields showed a light infection in York, Carleton and Victoria Co., N.B., late in the season; it was not observed in the coastal counties from Charlotte to Restigouche (C.H. Godwin). Early blight was again fairly common and, together with drought, was responsible for many light crops of Irish Cobbler in N.S.; it was first reported in Colchester Co. on July 23 and in Kings on Aug. 3 (W.K. McCulloch). A moderate epidemic developed on Irish Cobbler in P.E.I. and affected the growth of the plants to some extent (R.R. Hurst).

TUBER ROT (Alternaria Solani). A slight infection was seen here and there on Green Mountain in Que. (B. Baribeau). No tuber rot was noted in the Maritime Provinces (C.H. Godwin, W.K. McCulloch, S.G. Peppin).

BACTERIAL RING ROT (Corynebacterium sepedonicum) was found in 6 commercial fields, and in 4 others where the crop was for home consumption, in the Comox Valley district on Vancouver Island, B.C. It was first found on Oct. 25 in a 2 acre field, where the damage was severe; in the other 9 (about 8 acres), it caused a trace to slight loss. All the fields were planted with table stock which was supplied by one person. The exact source of the infection has not been traced, but it is believed to have come in table stock imported into the province. The disease has not been found in any field entered for certification (W.R. Foster, W. Jones, H.S. MacLeod).

Bacterial ring rot was first discovered in Alta. on 2 farms in 1937. The disease spread rapidly through the commercial potato-growing areas and was threatening the industry by 1940. Although the regulations were successively tightened, the annual survey revealed its presence on 235 farms, involving 1775 acres, in 1940. Damage occurred largely in the southern irrigation districts with scattered cases among the market gardens about Calgary, Medicine Hat and Drumheller. By this time a virtual quarantine was in force. In 1944 it was at last evident that the battle against ring rot was being won. In that year the number of diseased fields was barely higher than the year before and

the intensity of infection was less in the affected fields. In 1944, however, 2 fields were found at Edmonton. In 1945 only 137 fields, or 11.4% of the 1198 inspected, were found affected as against 241 or 23% in 1944. The intensity of infection was also less, averaging under 3%, while less than 20 acres showed over 10% of the plants diseased. The present measure of control has been achieved by: (1) introduction of disease-free seed -- sufficient seed of high quality will be available for the first time in 1946 to replace infected stocks found this year, (2) vigorous enforcement of quarantine regulations, which include regulating the quality of seed planted and the prompt disposal of infected stocks into safe markets, and (3) continued education respecting sanitation and other precautions against infection (J.L. Eaglesham). Ring rot was not found in any fields entered for certification, but it was present on 2 farms on which seed potatoes were being grown (J.W. Marritt).

Bacterial ring rot was reported from about 20 well separated places in Sask.; no cases of severe damage were seen in 1945, but numerous farms revealed a trace (R.J. Ledingham). Ring rot was found after digging in one lot of Columbia Russet entered for certification. This stock had been grown for several years where early frosts are the rule and the final field inspections may have been made too early for ring rot symptoms to appear. Two fields were rejected because ring rot occurred in fields of table stock on the same farm (A. Charlebois).

Ring rot was the major cause of rejection of fields entered for certification in Man. in 1945. It caused the rejection of 46 crops, 35 on field and 11 on bin inspection; a trace was found in 22 crops and it was present on 24 farms in crops of table stock. These latter fields were mostly in the larger table stock producing areas about Winnipeg and Selkirk. Two fields were rejected in the Thunder Bay District, Ont., on account of ring rot in table stock on the same farm (D.J. Petty). Ring rot has also reached serious proportions in table stock in Man. It was first seen in 1938 and has spread rapidly. Surveys made by Dominion Laboratory of Plant Pathology, Winnipeg, showed that in the spring of 1943, 8.3% of the 250 samples submitted by farmers, were infected and in the autumn of the same year 25% of the commercial potato fields around Winnipeg contained at least some diseased plants. In the 1944 crop 36% of the 50 table stock lots examined from Winnipeg stores contained some affected tubers, with 3.3% of the tubers per lot affected. In 1945 all but one of the commercial fields inspected about Winnipeg were diseased. A survey of the retail stores showed that about 10% of the tubers were now affected, and in Dec. 1945 two cases were reported where over a third of the tubers in storage were attacked (H.N. Racicot).

A survey was again conducted in Ont. Inspectors of the Ont. Department of Agriculture submitted to the St. Catharines Laboratory 308 samples of which 259 proved to be affected by the ring rot organism. These figures indicate a considerable reduction over 1944, when 590 samples were submitted and 464 showed positive infection. The most encouraging feature was that not over 8% of the cases were the result of infection on farms where the disease had ever been found before (J.K. Richardson). Out of 796 fields entered for certification, 4 were rejected in the field and one at bin inspection on account of ring rot (J.W. Scannell).

Bacterial ring rot was present in 69 or 8.6% of the fields entered for certification in Que. compared with 15.7% in 1944; there was a similar decrease in fields rejected because the disease occurred on the same farm. In general, ring rot was present in most commercial fields, but the percentage of infection was somewhat lower than last year and very little damage occurred at digging time from tuber rot (B. Baribeau).

A considerable increase occurred in the amount of ring rot in the crop entered for certification in N.B. Field and tuber inspections resulted in rejection of 96 fields amounting to 1004 acres, and an additional 66 fields totalling 397 acres due to ring rot in other fields on the farm. Among the rejected fields were 231 acres planted with infected Bliss Triumph seed from Nebraska (C.H. Godwin). The disease was not found in any crop in N.S.; many plants and tubers were examined at the Kentville Laboratory with negative results (W.K. McCulloch).

As a result of a clean-up campaign carried out by the Seed and Tablestock Inspectors in co-operation with the Provincial Department and the Charlottetown Laboratory almost all farmers in the 2 areas in P.E.I. where ring rot was present in 1944 got rid of their old stock, disinfected their premises, etc., and planted certified seed recommended by the Seed Potato Inspection Service. As a result, not a single case of ring rot was found on any farm, where it occurred previously, and only 3 new cases, all in table stock, were seen despite a very intensive survey in these districts particularly at digging time (S.G. Peppin, R.R. Hurst).

BLACK LEG (Erwinia phytophthora) was found in 61 (12%) fields inspected for certification in B.C.; infection was not over 1% in 54, and it caused the rejection of only 4 fields (H.S. MacLeod). Very severe black leg developed in June in several fields under irrigation near Lethbridge, Alta. Circumstantial evidence indicates that the outbreak was in part due to faulty handling of the seed prior to planting it in cold and wet soil. Black leg was also prevalent in low areas of other irrigated fields at Lethbridge and Brooks, where irrigation water had stood too long (G.B. Sanford). Black leg was present in nearly all fields in the Duchess and Brooks districts planted with local seed but fields that were planted with seed from northern Alta. were very free from black leg except in areas that were flooded. Only a few fields showed a trace in central and northern Alta. Of the fields inspected, 16% were affected and 11 of these were rejected for black leg (J.W. Marritt).

Black leg was fairly common in Sask., but the percentage of affected plants was generally low; in one field 5% of the plants were diseased (R.J. Ledingham). Black leg infection was moderate in 3 fields and slight in one in Man. (J.E. Machacek). In the fields inspected for certification black leg was present in 23 fields out of 132 and caused the rejection of 2 in Man., while the figures for northwestern Ont. were 38 fields out of 78, and 2 rejections (D.J. Petty). Black leg caused the rejection of 12 fields in central Ont.; all the cases were in areas where rainfall was heavy throughout the season (J.W. Scannell). In Que., black leg was virtually confined to the Chicoutimi and Lake St. John districts, where 25 fields out of 178 inspected were rejected (B. Baribeau). Out of 2746 fields inspected only 2 small ones were rejected for black leg in N.B. (C.H. Godwin). Black leg increased five-fold over last year in N.S. Out of 265 fields inspected, 34 were affected

and 2 rejected. A large part of the affected seed came from warehouses where frost had penetrated (W.K. McCulloch). Black leg was fairly prevalent in sections of Kings Co. and there were scattered infections elsewhere in P.E.I.; 23 fields were rejected. Very little black leg is found in fields planted in tuber units as compared with those where the seed has been cut for some time and held over due to adverse weather conditions. In fact many table stock growers now cut and plant the seed immediately in tuber units (S.G. Peppin).

BACTERIAL SOFT ROT (Erwinia ?carotovora) was observed in tubers received from Prescott, Ont., Feb. 5; the tubers showed a soft rot of the pith and infection appeared to have taken place through mechanical or insect injuries (H.N. Racicot). A trace was observed in a lot of Green Mountain in Queens Co., P.E.I., on March 12 (R.R. Hurst).

E.H. Garrard (Can. J. Research C, 23(3): 79-84. 1945) describes a rot present in tubers received Mar. 1944 grown in 1943 in Victory gardens in the Newmarket district, Ont. Isolation, inoculation and re-isolation proved that an organism closely resembling Pseudomonas fluorescens (Flügge) Migula caused active rotting at 5°C, but little or none at all at 25°C and moderate decay at 18°C. It appears to be a wound parasite. It is not suggested that it should be regarded as a separate species. In cooked potatoes rotting was most severe at 25°C.

POTATO ROT NEMATODE (Ditylenchus destructor Thorne). The potato rot nematode (Gerald Thorne. Ditylenchus destructor, n.sp., the potato rot nematode, and Ditylenchus dipsaci (Kühn, 1857) Filipjev, 1936, the teasel nematode (Nematoda: Tylenchidae). Proc. Helminth. Soc. Washington 12(2): 27-34. 1945) was found in Green Mountain potatoes at York, P.E.I., in Nov. 1945 by C.W. Ramsay, Plant Protection Division. Specimens taken to the Laboratory of Plant Pathology, Charlottetown, were forwarded to the Ottawa Laboratory, where the disease was recognized. The identity of the nematode was confirmed by Dr. A.D. Baker, Division of Entomology. The affected tubers were all from one field where the same trouble was alleged to have been noticed by the proprietors in 1942. The nematode was also found in Feb. 1946 in Irish Cobbler potatoes grown at Uigg, P.E.I. In both crops, the percentage of infected tubers was low. Special surveys have been projected to locate additional cases, if any, and experiments to eradicate the pest if at all possible in the cases already discovered (H.N. Racicot).

WILT (Fusarium oxysporum) was found in 98 fields (19%) entered for certification in B.C. and caused the rejection of 4. The pathogen was isolated from wilting plants of Netted Gem and White Rose from Ladner, Lulu Island and North Saanich, and was identified as F. oxysporum f. tuberosi by W.L. Gordon. The disease is quite common in White Rose, usually late in the season (H.S. MacLeod, W. Jones). Small amounts of wilt were present in 36 fields inspected in Man. and 15 in northern Ont. (D.J. Petty). A moderate infection was recorded at Brandon, Man. (J.E. Machacek). One field was rejected on account of wilt in central Ont. (J.W. Scannell). About 15% of the plants were seen to be wilting and dying on one farm in Que. (B. Baribeau).

WILT (Fusarium and Verticillium). A small amount of wilt was seen in 6% of the fields inspected in Alta.; most of them were located in the Brooks district (J.W. Marritt). Severe infections were observed in table stock fields around Indian Head, Regina, Moose Jaw, and Cavalier, Sask. (H. Charlebois). The disease is severe in sandy soil, particularly in dry years; very little seen on the heavier soils (R.J. Ledingham). Low percentages of wilt were reported in fields of Katahdin about Bath and Perth, N.B., and in one field of Green Mountain in Restigouche Co. (C.H. Godwin).

STEM-END ROT (Fusarium Solani var. eumartii). A few affected tubers were found at scattered points in Que. (B. Baribeau).

STORAGE ROT (Fusarium spp.). Dry rot was common in potatoes in bins on Lulu Island and at Cloverdale, B.C. Isolations from tubers showing stem-end rot were identified as F. Solani by W.L. Gordon (W. Jones). Storage rot caused moderate damage at Duhamel, Alta., F. coeruleum and F. culmorum being isolated (A.W. Henry). Affected tubers were received from Rockglen, Sask. (T.C. Vanterpool). Half the tubers showed infection by dry rot (F. coeruleum) 3 days after harvesting at Macdonald College, Que. (R. Pelletier); the dry rot was probably secondary to late blight rot (I.L.C.). Tuber rot was not extensive in N.B. In one new potato house, which had been insulated but not provided with proper ventilation, damage to both seed and table stock was considerable (C.H. Godwin). Many specimens of storage rot were brought in from various parts of P.E.I.; infection varied from a trace to 10%; it usually follows late blight rot (R.R. Hurst).

PIMPLES (Oospora pustulans). A single affected tuber of Irish Cobbler was received from Queens Co., P.E.I. (R.R. Hurst).

RHIZOCTONIA (Pellicularia filamentosa (Rhizoctonia Solani). Infection was slight in 325 fields, moderate in 103 and severe in 16 out of 506 inspected in B.C.; tuber infection when present was also light in 1945 (H.S. MacLeod). Rhizoctonia caused but slight damage in Alta. and seed tubers were also very free from sclerotia. Only 2 lots harvested late in the season were hard to grade (J.W. Marritt). The disease was unusually destructive to the growing crop early in the season in Sask.; in a plot of Early Ohio at Melfort, plants from sprouted sets were so severely affected that the crop was worthless (A. Charlebois). It was the commonest disease seen in northern Sask., although the damage appeared slight (R.J. Ledingham). In a planting at Swan River, Man., 10% of the hills were affected (W.A.F. Hagborg). Slight infections were observed in most fields in Man. and north-western Ont., and the sclerotia on the tubers after harvest were likewise few (D.J. Petty). Rhizoctonia was unusually prevalent in central Ont. Some lots had to be regraded as the disease appeared to progress in the bin (J.W. Scannell). Rhizoctonia was seen in the field throughout Que., but tuber infection was slight. On bin inspection it appeared to be most abundant in Lake St. John and Chicoutimi districts (B. Baribeau). Rhizoctonia caused little damage to the growing crop in N.B. and sclerotia were not abundant on the tubers, infection averaging about 3% (C.H. Godwin). It was not in evidence in the field in N.S. but tuber infection was about 4%. In 3 fields in which potatoes had been grown in 1944, tuber infection was 17, 20 and 50% (W.K. McCulloch). Very little rhizoctonia was seen in the field in P.E.I., but infection was above average on the tubers, especially on late varieties (S.G. Peppin).

PINK ROT (Phytophthora erythroseptica) was first reported in Canada from B.C. (P.D.S. 23: 43 and W. Jones, Sci. Agric. 25(10): 597-600. 2 pl. 1945). The same or a similar disease has now been recognized in Man. and Que.; unfortunately only the isolates from B.C. have been induced to produce sporangia in culture, but there seems little doubt that some of the Quebec isolates are P. erythroseptica (I.L. Conners, L.T. Richardson). Pink rot was present in several standard varieties of potatoes in wet spots of a field at Winnipeg, Man. on Sept. 28 (J.E. Machacek).

Pink rot was first observed at Ste. Anne de la Pocatière, Que. in Aug. 1942 in the plots of the Plant Protection Division. The disease was again seen in the greenhouse in the winter 1942-43 in tuber-indexed material. Many plants showed a darkening of the stem, petioles and leaves, and some plants were dying when they had reached four inches in height. In the field in 1942 affected plants showed many leaves slightly wilted with little or no discolouration of the stem. When the plants were dug usually at least one or two tubers close to the mother set showed a watery rot resembling the injury caused by frost. The rot commonly appeared first at the stolon end and the lenticels over the dark affected part soon turned dark grey to black. The affected part was somewhat spongy to the touch due to the watery consistency of the rot. When the tubers are cut open the affected flesh is dirty white to grey, or brownish grey.

The disease was seen again in 1943, 1944 and 1945. In Aug. 1945, a wilting and dying of part of the plant was also observed. Some plants failed to show any affected tubers. In the fall when the plots were harvested, 25% of the tubers were destroyed, the infection being worse in low, wet spots in the field; there was a further loss of 5-7% in the first month of storage. The disease has been found in Irish Cobbler, Green Mountain, Beauty of Hebron, Dooley, Sequoia, Katahdin, and Sebago (B. Baribeau).

LATE BLIGHT (Phytophthora infestans) was not as prevalent nor as severe in B.C. in 1945 as in some years, although it was found in many fields near the coast. In some that were not sprayed or dusted sufficiently early or often, it caused quite heavy losses as a tuber rot, especially in a few Green Mountain and White Rose fields in the Fraser River Valley. (H.S. MacLeod). Late blight caused moderate damage in the 1944 crop in storage at Millet and Vermilion, Alta.; it was not observed during the 1945 growing season (M.W.C.).

The weather was favourable for the development of late blight in Man. in 1945 and a severe epidemic was expected. However, an epidemic did not develop because (1) owing to the scarcity of potatoes, almost all the local stocks, containing many infected tubers, were consumed and the majority of fields were planted with uninfected, imported stock, (2) as a result of continued radio and press publicity the growers were ready to begin spraying at the first signs of the disease and (3) although late blight was first observed on Aug. 13, a period of dry weather curtailed its spread until late in the season. Much of the crop was sprayed or dusted in 1945, but the disease was not well controlled because of continued wet weather during September. Consequently in a few areas it caused severe damage particularly in the stored tubers. In general the disease was far less destructive this year than in 1944 (J.E. Machacek). Late blight

infection was in general slight in northwestern Ont., although it was somewhat heavier at Pinewood and in the Slate River Valley (D.J. Petty). Late blight was not very prevalent over most of central Ont. in 1945. Primary infections were nemerous, but the disease did not become serious due to hot dry weather and thorough spraying (J.W. Scannell). Late blight reached epidemic proportions for a short period in July in Essex and Kent Counties. Digging operations were stopped for a time until hot weather arrested further spread of the disease (L.W. Koch). Although comparatively few late potatoes are grown in Lincoln Co., late blight was extremely severe in 1945 due to the abnormal precipitation in Sept. It appeared to be fairly well controlled on the vines but tuber rot was severe (J.K. Richardson).

Late blight was first found around Three Rivers, Que., on July 30-31, everywhere along the lower St. Lawrence and in the Gaspé Peninsula except Matane and Rimouski Counties on Aug. 1-3, and in the Chicoutimi and Lake St. John districts on Aug. 7. These are the earliest dates on record in Que. Immediately after the appearance of late blight a period of drought checked further spread. Nevertheless tuber infection occurred throughout the province and ranged from a trace to 5% (B. Baribeau). Although late blight was not noticed in a planting of Green Mountain, at Macdonald College, Que., 60% of the tubers showed blight rot 3 days after the crop was harvested (R. Pelletier). Late blight was affecting about 1% of the plants of Bliss Triumph and Warba at the Montreal Botanical Garden on July 16; it spread later to all the plants (J.E. Jacques). In the Quebec district, late blight appeared at Beauport and the Island of Orleans about Aug. 1. Little further development was observed and the crop was harvested under satisfactory conditions. However, blight rot developed on the tubers and it was causing some loss at the beginning of winter (O. Caron).

Late blight was not severe in N.B. On account of the very dry summer and fall, the crop matured comparatively early and few viable spores were present to infect tubers at digging time. The severest infection was reported in Houma (C.H. Godwin). Late blight was fairly general in N.S., but infection was slight except in a few fields, in which the spray schedule was not completed. It was first seen in Kings Co. on July 13 and was fairly common by Aug. 24. A slight infection was present on Aug. 14 in Colchester Co. Although it was not noticed in Cumberland Co. until after Aug. 18, it rapidly destroyed the vines soon after. Tuber rot averaged 0.3%, but in Cumberland Co. it was at least 1%. Where modern spraying equipment was used little or no rot occurred (W.K. McCulloch).

Late blight was little in evidence on the vines and caused no defoliation in P.E.I. Irish Cobbler and Sebago escaped almost entirely, but Green Mountain and Katahdin developed some rot 2-3 weeks after digging. A killing frost did not occur previous to harvest and few growers took the precaution to kill the vines the required 2 weeks before digging. Losses were not severe, 2-5% of the tubers being affected (S.G. Peppin). Late blight was first recorded in the field in P.E.I. in Prince Co. on July 14. A severe case was found in cull piles at Hunter River on July 1 and at Montague on July 15 (R.R. Hurst).

Experiments on the control of late blight conducted at Charlottetown, P.E.I. for the past 2 years by L.C. Callbeck reveal that plots sprayed with

low-lime Bordeaux mixtures gave the highest yields and the highest percentages of marketable tubers. Perenox was equal to the high lime Bordeaux, Copper-A was slightly less effective and Dithane and Zerlate, tested only in 1945, gave rather poor control of late blight. In a set of experiments conducted this year under the supervision of G.H. Berkeley and Prof. R.W. Thompson, in Middlesex Co., Ont., plots sprayed with Dithane plus DDT gave the highest yields, while Bordeaux 4-4-40 plus DDT and DDT alone were next 2 highest. Late blight developed only at the close of the season, leaf hoppers being the limiting factor in these plots (I.L.C.).

LEAK (Pythium sp.). A trace was seen at Dauphin, Man. (J.E. Machacek).

STALK ROT (Sclerotinia sclerotiorum) affected a few plants in a field on chocolate loam soil at Cloverdale, B.C. (W. Jones).

SILVER SCURF (Spondylocladium atrovirens) was observed a few times at bin inspection in Que., but infection was very slight (B. Baribeau). Silver scurf, in the sooty stage, was conspicuous on Irish Cobbler, Katahdin, Green Mountain and Sebago in April-May 1945 in N.S. (W.K. McCulloch). One case of a very advanced infection was seen on Green Mountain in Queens Co., P.E.I. on Mar. 12 (R.R. Hurst). A slight infection was observed a few times in fall shipments (S.G. Peppin).

POWDERY SCAB (Spongospora subterranea). Infection was heavy on tubers received from Graham Island in April and it was present on a few tubers from Lulu Island in Nov. (W. Jones). A slight infection was found a few times in B.C. in 1945 (H.S. MacLeod). Slight infections were found occasionally in Témiscouata Co., Que.; the disease was found for the first time in the Chicoutimi district, when a slight infection was recorded in one bin (B. Baribeau). A slight infection was noted in table stock of unknown source on the market in Saint John, N.B. (C.H. Godwin). Powdery scab was found in 2 lots in N.S.; infection was 60% in a lot of Bliss Triumph and 0.8% in one of Katahdin (W.K. McCulloch).

WILT (Verticillium sp.). The organism was isolated from a tuber of White Rose from Abbotsford, B.C. (W. Jones, H.S. MacLeod). Wilt was less prevalent than usual at Edmonton, Alta., fairly common in gardens at Calgary, and quite common in irrigated potato fields in the Lethbridge district, where it has been observed for several years (G.B. Sanford). Several specimens from King and Colchester Co., N.S., collected by the potato inspectors, yielded the organism from the roots (J.F. Hockey). More Verticillium wilt was present in P.E.I. in 1945 than for the past 5 years; it is most frequent in Irish Cobbler and in hot, dry seasons (S.G. Peppin).

CALICO (Solanum virus 10). Two Irish Cobbler plants showing symptoms of calico were found in a field at the Station, Fredericton, N.B. An unidentified potato tuber from Sask. sent by H.N. Racicot gave plants with prominent symptoms of calico. The virus in these potatoes was identified as Solanum virus 10 (D.J. MacLeod). Potato specimens received from Prince Albert, Sask., showed symptoms that corresponded closely with those of calico as reported in the literature (R.J. Ledingham).

LEAF CURL (virus). Five seedlings grown at the Station, Fredericton, N.B., showed a severe curling and puckering of the upper leaves. These leaves were generally reduced in size and sometimes completely reversed, the underside being uppermost. They were also rolled inwards from the margins presenting a cupped appearance. Parts of the laminae were depressed and light green. The affected leaves eventually became chlorotic and died prematurely. Scions from affected plants were grafted to tomato. In 35 days a disease similar to that in the seedlings appeared in the tomato. The identity of the virus has not been established (D.J. MacLeod).

LEAF ROLL (virus) was found in 225 fields out of 508 inspected in B.C. and caused the rejection of 48. Several of these rejections were due to current season infection, especially in the Lower Fraser Valley where the aphid population was high (H.S. MacLeod). High percentages were noted in some commercial crops on the Lower Mainland (W. Jones). Leaf roll was present in 17% of the fields inspected in Alta. and 2 fields were rejected (J.W. Marritt). Only small amounts of leaf roll were seen in fields entered for certification in Sask. (A. Charlebois). Leaf roll rarely occurs in significant amounts in Sask. in commercial fields, where the seed is renewed occasionally by securing certified seed, but is common in home gardens especially in towns and villages (R.J. Ledingham). Leaf roll was present in 16 fields in Man. and 7 in northwestern Ont.; one field in Man. was rejected (D.J. Petty). A severe infection was seen in a field of Bovee at St. Adolphe, Man. (J.E. Machacek). Leaf roll caused the rejection of 6 fields in central Ont. in 1945; Chippewa seems more susceptible than other varieties (J.W. Scannell).

Leaf roll was slightly less prevalent in Que. than in 1944 in fields entered for certification. Only 2.5% of the fields inspected were rejected for it when certified seed was used as compared with 2.8% in 1944. In commercial plantings, especially of President, many fields were seen where 15% of the plants were affected. The yield was only 120 bu. per acre compared with 225 bu. where certified seed was used. Aphids were quite numerous in Sept., and killing frosts did not come until Oct. Accordingly an increase of leaf roll is expected in 1946 (B. Baribeau). Leaf roll was recorded in 2,746 fields and caused the rejection of 793 amounting to 5,925 acres in N.B. All varieties grown for seed were affected. Leaf roll was also prevalent in fields of table stock (C.H. Godwin). Leaf roll (Solanum virus 14) was common in fields of table stock of Katahdin, Green Mountain, and Irish Cobbler in York, Sunbury, Westmorland, Carleton and Victoria Co.; infection ranged from a trace to 22% (D.J. MacLeod). The incidence of leaf roll in N.S. in 1945 was probably the lowest on record; only 2 fields were rejected for certification and no conspicuous cases were seen or reported in table stock fields (W.K. McCulloch). Leaf roll was again relatively light in P.E.I.; 59 fields, approximately 1.0%, of those entered, were rejected for it. It may be noted, however, that one-half of the total rejections occurred in Prince Co., one-third in Queens and one-sixth in Kings. The greatest incidence of leaf roll, therefore, occurred in the sections of P.E.I. nearest to the mainland of N.B. (S.G. Peppin).

MOSAIC (virus) was found in 99 fields and caused the rejection of 10 in B.C.; the disease has been much less prevalent in the past 2 years than for several years previous (H.S. MacLeod). Mosaic, never a problem in Alta., was recorded only in Carter's Early Favorite (J.W. Marritt). Little mosaic

was seen in Sask. in 1945 in comparison with previous years (A. Charlebois). Mosaic is common in city gardens in Sask. and must have an adverse influence on yields; it is not common in farm plantings (R.J. Ledingham). Mosaic was recorded in only 12 fields in Man. and in none in northwestern Ont. (D.J. Petty). Only 2 fields were rejected in central Ont.; aphids, however, were more numerous in 1945 than in previous years (J.W. Scannell). The number of rejections for mosaic in Que. dropped from 35 (3.7%) in 1944 to 5 (0.6%) this year, the lowest figure on record. In commercial fields, mosaic was quite severe, fields with 15% infection being very common. Leaf roll was even more severe (B. Baribeau). Last year (P.D.S. 24: 65) it was predicted that rejections for mosaic would be of the order of 5-10% in fields entered for certification in Que. in 1945. This prediction has not been borne out. It now appears that the greater freedom of foundation and foundation A seed from mosaic is a more important factor than aphid population in controlling the incidence of mosaic in the current crop (I.L.C.). Mosaic caused the rejection of 2 fields totalling 2 acres in 1945 in N.B. as against 5 rejections in 1944. The average infection in all fields inspected for certification was 0.2% in 1945 as compared to 0.1% last year, which seemed to indicate a somewhat more general incidence (C.H. Godwin).

A trace of rugose mosaic (Solanum virus 2) was found in table stock fields of Katahdin, Green Mountain, Irish Cobbler, and Bliss Triumph in York, Sunbury, Carleton, and Victoria Co., N.B. Mild mosaic (Solanum virus 3) ranged from a trace to 3% in table stock fields of Green Mountain in the same counties with a trace in fields of Green Mountain entered for certification. A trace of crinkle mosaic (Solanum viruses 2 and 3) was found in table stock fields of Green Mountain in York, Carleton, and Victoria Co. A trace of mild mosaic (Solanum virus 11) was recorded in table stock fields of Irish Cobbler in York, Sunbury and Carleton Co.; this is the common mild mosaic of Irish Cobbler, a variety immune to Solanum virus 3, which produces a mild mosaic in Green Mountain. Two plants showing leaf rolling mosaic were located in a field of Green Mountain, adjacent to a field of Irish Cobbler showing a trace of mild mosaic, in Sunbury Co. The virus was identified as Solanum virus 11). Three plants of Idaho Russett showing aucuba mosaic were found in a garden at Shediac, Westmorland Co.; the virus was identified as Solanum virus 9.

As in 1944, no fields were rejected for mosaic in N.S. and the percentage of affected plants continued low. The larger growers have the seed tested by the tuber-index method in the greenhouse before planting; this practice appears to have been effective in reducing mosaic (W.K. McCulloch). Only 30 fields comprising 89 acres were rejected on account of mosaic in P.E.I.; it was, as usual, more prevalent in Green Mountain than in any other variety (S.G. Peppin).

NET NECROSIS was found in several crops in B.C. in 1945, but it was not as severe as in some years. To date only a few lots of tubers, chiefly of Netted Gem from the Lower Fraser Valley, have been rejected (H.S. MacLeod). Some potatoes grown from certified seed on vacant lots in Calgary showed a high percentage of affected tubers; this is believed to be due to infection by leaf roll (J.W. Marritt). Net necrosis was reported in a few lots during bin inspection along the St. Lawrence, Que., but the infection is very slight compared with last year (B. Baribeau). Net

necrosis was severe in Green Mountain in N.B. and resulted in the rejection of a large quantity of seed (C.H. Godwin). Net necrosis was found in N.S. in 18 acres of Irish Cobbler, with 3% of tubers affected (W.K. McCulloch). Six tubers of the 1944 crop affected by net necrosis were each cut in two and planted in 12 pots in the greenhouse at Charlottetown, P.E.I.; all plants developed leaf roll (R.R. Hurst).

PURPLE or BUNCH TOP (virus). In 1944 tubers from a number of plants of Katahdin and Chippewa, grown at the School of Agriculture, Olds, Alta., and showing symptoms like those of purple top, were collected and planted as separate units in the Laboratory plots at Edmonton in 1945. The resulting plants appeared normal. This information is presented here to indicate possible difficulty in identifying accurately so-called purple top (G.B. Sanford). Purple dwarf affected 5% of the fields entered for certification in Alta.; the average infection was less than 1% (J.W. Harritt). Purple top was seen in a fairly large number of fields in Sask., but the percentage of infection was very low compared with 1944 (A. Charlebois). Purple top was observed in both Man. and northwestern Ont., but the percentage of plants affected was much lower than last year (D.J. Petty). Although an increase of purple top was expected in 1945, only an occasional plant was found in fields in central Ont. (J.W. Scannell). Purple top was not as general in N.B. as in recent years; it was chiefly present in Katahdin (C.H. Godwin).

Bunch top was found in N.B. in Katahdin, Irish Cobbler, Sebago, Houma, Chippewa and Green Mountain and also in 17 seedlings. Infection in the standard varieties ranged from a trace to 2%; in them, the virus caused a typical bunch-top effect (purple-dwarf) characterisized by a distortion of the leaves and stems, the formation of aerial tubers, aerial stolons, wilting and general dwarfing of the plant. In Green Mountain the symptoms were generally less severe and the top section of the plant presented a chlorotic rosette effect. In the other varieties, the leaves and stems had a purplish cast. The virus gave rise to a variety of symptoms in the seedlings: in some, it caused only a rolling of the leaves and a dwarfing resembling leaf roll (Solanum virus 14); in others it gave rise to a typical bunch top (purple-dwarf) condition. The coloration commonly associated with the bunch-top disease varied as the natural pigmentation of the seedlings. It was also found that the bunch-top virus sometimes invades only a part of the plant. In many of the tubers from the diseased plants examined only one or two eyes were found to be infected. These infected eyes sometimes failed to germinate or gave rise to small weakened or distorted stalks that often died at a height of three to four inches. In a few cases the diseased eyes produced plants that showed typical bunch-top symptoms. Occasionally the diseased stalks completely recovered from the effect of the virus and developed into a normal plant. The infected sections of tubers usually became very hard after three to four months in storage. A number of these hardened tubers remained intact for two years when maintained under ordinary cellar conditions. Usually the uninfected sections of tubers collapsed long before the infected portions showed any signs of breakdown. Some infected tubers also remained intact under field conditions in the soil for four months. A number of whole tubers used as sets (Katahdin and Sebago), which failed to germinate and remained intact in the soil under field conditions until harvest, were found to be infected with the bunch-top virus. This suppression of germination results in many misses when bunch-top infected tubers are used for seed. The infected sections of the tubers frequently developed spindling sprout.

Seven cases were discovered where the leaf roll virus (Solanum virus 14) was associated with bunch-top virus in potatoes under field conditions. In one Green Mountain plant, the bunch-top virus occurred with the mild mosaic virus (Solanum virus 3). In two plants seen the bunch-top virus was associated with Erwinia phytophthora. It was also twice found in association with Rhizoctonia Solani in Katahdin. The symptoms associated with the combinations of viruses, and the blackleg and rhizoctonia organisms with the bunch-top virus, were generally more extreme than when the diseases occurred singly. In all the cases examined comprising 6 standard varieties and 17 seedlings, the bunch-top virus could not be found in tubers or plants beyond the second generation from the original diseased clones. All attempts to transmit the bunch-top virus by means of the leaf hopper, Macrosteles divisus, were unsuccessful. This suggests that the virus is either an aberrant strain of Callistephus virus 1 or an entirely different virus (D.J. MacLeod).

Purple top, which was found in virtually all fields of Katahdin and Sebago in 1944, was reported in 11 out of 114 fields in the current season. In only one field were 1% of the plants affected (W.K. McCulloch). Purple top was recorded in table stock fields of Irish Cobbler, Green Mountain, and Katahdin in P.E.I. (R.R. Hurst).

SPINDLE TUBER (virus) was seen in several table stock fields in southern Alta.; in one field 10% of the plants were affected (J.W. Marritt). A small amount of spindle tuber was found in fields entered for certification in Man. (D.J. Petty). A mere trace was observed in fields inspected in Ont. (J.W. Scannell). Spindle tuber was reported only in a few fields in Que., and very few affected tubers were noted at bin inspection (B. Baribeau). Definite cases of spindle tuber were noted in a few fields of Katahdin in N.B. (C.H. Godwin). A trace of spindle tuber (Solanum virus 12) was found in Green Mountain and Bliss Triumph table stock fields in York Co.; 2% of the plants were affected in a seedling tested under field conditions for virus resistance (D.J. MacLeod). It was not reported in the field in N.S., but a few off-shape tubers were found when Katahdin and Sebago were being graded (W.K. McCulloch). The disease was recorded a few times in Sebago and Katahdin and very rarely in Green Mountain in P.E.I. (S.G. Peppin).

WITCHES' BROOM (virus) was found in 8% of the fields inspected in B.C.; in 2 fields, over 1% of the plants were affected on first inspection (H.S. MacLeod). Less than 1% of the plants were affected in 2 fields in Alta. (J.W. Marritt). One Green Mountain plant was found in a tuber-index test conducted by Seed Potato Certification Service in N.B. The virus was transmitted to tomato in which it produced the typical symptoms of Solanum virus 12 (D.J. MacLeod). One diseased plant was found in a field of Irish Cobbler table stock in P.E.I. (R.R. Hurst).

YELLOW DWARF (virus). A slight amount was reported in 2 fields in the B.C. Interior (H.S. MacLeod). Affected plants from a row of seedlings were sent in from a test plot at O.A.C., Guelph, Ont., by N.M. Parks (H.N. Racicot).

BLACK HEART (non-parasitic) affected 3 tubers from Queens Co., P.E.I., received Jan. 25, 1945 (R.R. Hurst).

FERTILIZER INJURY. Three sets of Katahdin were received from Alliston, Ont.; in two sets the eyes had been killed by fertilizer, while the third set bore sprouts with abnormally short internodes and showed injury from the fertilizer in addition (H.N. Racicot).

FROST. A frost on Sept. 27 in central and northern Alta. injured all potatoes near the surface, making grading of the crop difficult (J.W. Marritt). As the weather was wet in Ont. during the normal time of digging, many tubers were touched by frost before harvesting was complete. However, after the potatoes were stored for a time, it was possible to grade out the injured tubers (J.W. Scannell). An early frost caused some tuber injury in Restigouche Co., N.B. (C.H. Godwin). Field frost caused a 2% loss in a 30-acre crop of Katahdin in N.S. (W.K. McCulloch).

GIANT HILL (cause unknown) was reported in 209 fields inspected in D.C. and in five over 1% of the plants were affected (H.S. MacLeod). A number of fields in northern Ont. showed a trace of the trouble (J.W. Scannell). Giant hill was noted occasionally in N.B. (C.H. Godwin) and N.S. (W.K. McCulloch). One plant of Giant Hill was found in a field of Irish Cobbler in York Co., N.B.; 2 plants of Green Mountain grafted with scions from the affected plant developed normal foliage and tubers (D.J. MacLeod). A few affected plants of Green Mountain were seen in the Laboratory spray plots, Charlottetown, P.E.I. (R.R. Hurst).

LOW TEMPERATURE INJURY. Tubers stored at Blenheim, Ont., all winter showed injury when received May 28 (H.N. Racicot).

MAGNESIUM DEFICIENCY was recorded by several inspectors in quite a number of fields particularly in Kings and Queens Co., P.E.I. (S.G. Peppin). It was noted that the addition of 1% magnesium to the fertilizer was not sufficient to prevent this trouble in P.E.I. fields. Many growers are in addition applying magnesium sprays (R.R. Hurst).

SEED-PIECE DECAY. Half the sets were affected in a field of Houma and Warba in Queens Co., P.E.I.; the decay was the result of severe chilling and poor aeration in storage (R.R. Hurst).

SPRAIN (cause undetermined) was found in tubers of 2 seedlings sent to the Laboratory for testing; they produced normal plants and tubers (D.J. MacLeod).

STEM-END BROWNING slightly affected one lot in Témiscouata Co., Que. (B. Baribeau). The trouble was reported several times in late fall in Green Mountain in N.B. (C.H. Godwin). Stem-end browning was found in 2 lots of Green Mountain tubers at the Fredericton Station. Three tubers from each lot were analyzed for viruses. Only Solanum viruses 1 and 4 (latent virus) were found (D.J. MacLeod).

SUN SCALD caused slight damage in 2 fields and moderate damage in 4 in Man. (W.L. Gordon).

PUMPKIN

POWDERY MILDEW (Erysiphe Cichoracearum). Infection was general in a planting of Sugar Pie at Lytton, B.C. (G.E. Woolliams).

YELLOWS (virus). A trace was found in a planting at Maugerville, N.B.; the symptoms were identical with those described in P.D.S. 24: 70 (D.J. MacLeod).

RADISH

BLACK POD BLOTCH (Alternaria Raphani) was severe in a field of Cornet, nearly an acre in extent, being grown for seed in Lincoln Co., Ont.; the loss was estimated to be 50% of the crop (J.K. Richardson). An examination of specimens revealed spots on the older pods, stems, and leaves; the upper pods were completely blighted and on some A. Raphani was fruiting. Seed heavily infected with A. Raphani was planted in the greenhouse and in the field at Ottawa, and symptoms were carefully recorded. The pathogen may cause some blighting of the seedlings before or after they emerge. On the cotyledons the lesions are marginal, light brown to black, sometimes ½ to ¾ in. diameter with net-like edge, or the lesions are discrete black dots sometimes circumscribed by a yellow to yellow-green halo. On the hypocotyl the lesions are few to many, black dots, flecks or stripes. Sometimes the hypocotyl is girdled at ground level. On older plants, characteristic black scabby lesions are formed on the swollen hypocotyl or "root" of the red globe varieties. These areas are where the diseased cortex is still attached and usually occur on opposite sides of the root due to the lesion being split longitudinally and separated by the enlargement of the vascular system. The diseased tissue is fissured and flaky in appearance but remains more or less firm and involves only the outer layers of xylem. In the field, the lesions on the leaves were roughly circular to broadly elliptical, azonate, nearly dry to papery, slightly raised at the margin, buff to brownish olive, from under 1 to 10 mm. diameter, sometimes coalescing into large, irregular areas. On the pods the lesions are at first black dots with water-soaked margins. Later they become larger, circular to irregular and may coalesce and involve large areas. Frequently very young pods are killed and rapidly turn dark. Similar lesions, varying greatly in size and abundance, are found on the seed stalks, and the slender upper branches may be girdled and killed (R.G. Atkinson).

BLACK ROOTROT (Aphanomyces Raphani). A heavy infection occurred on Long White Icicle at the Station, Kapuskasing, Ont., but only a trace was present on adjacent red globe varieties (R.G. Atkinson).

DOWNY MILDEW (Peronospora Brassicae) was general on a seed crop of Red Turnip and caused slight damage at Westholme, B.C. (W. Jones). A moderate to heavy pod infection occurred on about 75% of the plants in a small plot of Saxa at the Division of Horticulture, C.E.F., Ottawa, Ont.; some of the more severely affected were ripening prematurely. Many of the young pods were killed or reduced in size. A trace to moderate infection also occurred on nearly every plant of Scarlet Turnip White Tip affecting leaves, stalks, and pods (R.G. Atkinson).

DAMPING OFF (Rhizoctonia Solani). The pathogen was isolated in January from a few seedlings from B.C. seed (I. Mounce).

STERILITY (virus) was found in 3 plants in a garden at the Station, Fredericton, N.B. The disease appears to be similar to that causing sterility in turnip and wild radish (D.J. MacLeod).

LEAF ROLL (virus). Three plants in a garden at the Station, Fredericton, N.B., developed a severe upward rolling and unevenness of the leaves. The apical leaves were the most severely rolled and presented a rosette appearance. Scions from the affected plants were grafted to broccoli. After 30 days the latter showed a definite rolling and unevenness of the top leaves, resembling that in radish. The trouble is therefore considered to be of virus origin (D.J. MacLeod).

RHUBARB

LEAF SPOT (Ascochyta Rhei) caused moderate damage in a garden at Edmonton, Alta. (L.E. Tyner).

GREY MOULD (Botrytis cinerea) caused a wilt of the young central leaves in several clumps being forced at North Kingston, N.S., resulting in a 5% loss of the late crop (J.F. Hockey).

CROWN ROT (cause unknown) was observed at many points in northern Sask. In the Saskatoon area, all plantings were more or less affected, some containing 25% diseased plants (R.J. Ledingham). The trouble is again common in Sask. after being relatively scarce for a few years; enquiries received from Laird and Melfort (T.C. Vanterpool). Some 30-40% of the plants of Macdonald College were affected at Ste. Anne de Bellevue, Que. (R. Pelletier).

SALSIFY

WHITE RUST (Cystopus cubicus) heavily infected the leaves of Sandwich Island at the Botanical Gardens, Montreal, Que. (J.E. Jacques).

SHALLOT

FROST. An examination of bulbs from large fields of shallots at Ste. Angèle, Que., on May 15 revealed injury at the base of every bulb with 75-80% of the roots completely or partially severed from the bulb; the tips of the leaves also showed frost damage. It appeared that the injury was due to heavy frosts, after the snow cover was gone, which had caused the ground to heave (H.N. Racicot).

SPINACH

DOWNY MILDEW (Peronospora Spinaciae) was general in several truck gardens at Marpole, B.C., and caused moderate damage (W. Jones).

SQUASH

COTYLEDON SPOT (Fusarium oxysporum). A Fusarium was isolated from cotyledons of seedlings grown in the greenhouse at Saanichton, B.C.; it was identified as F. oxysporum by W.L. Gordon (I. Mounce).

STORAGE ROT (Rhizopus sp.) caused a loss estimated by the grower at 5% at Waterville, N.S. (J.F. Hockey).

SCLEROTINIA ROT (S. sclerotiorum) affected 12% of squash in a planting in Alta. on black Edmonton loam (G.B. Sanford).

CURLY TOP (Beta virus 1) affected about 1% of the squash vines at Grand Forks, Kelowna, and Summerland, B.C. (G.E. Woolliams).

YELLOWS (virus) was severe on 20% of the plants in a plot at the Station, Fredericton, N.B. All the infected plants bore small improperly formed fruits, which were of no commercial value. The virus was found to be similar to that described as the cause of yellows in pumpkin (P.D.S. 24: 70) (D.J. MacLeod).

SWEET CORN

EAR ROT (Fusarium moniliforme). A trace was observed in a planting at Beaumont, Que. (R.O. Lachance).

BACTERIAL STALK ROT (Phytomonas dissolvens). Infection was moderate in a garden at Edmonton, Alta. (L.E. Tyner).

RUST (Puccinia Sorghi) was moderate in a planting in Lincoln Co., Ont., on Vineland Inbred #3, while no infection was seen on 2 other strains nearby (J.K. Richardson).

SMUT (Ustilago Maydis). Slight infection at Shell Lake, Sask. (H.W.M.). No plantings observed in Lincoln Co., Ont., were free from smut, but the later sowings were least affected (J.K. Richardson). Specimens were brought in from one garden in Queens Co., P.E.I. (R.R. Hurst).

TOBACCO

Dr. L.W. Koch has contributed the account presented below from surveys in the old and new tobacco belts of Ont. and from reports received from Que.

Diseases in the Seedbed

YELLOW PATCH (excessive nutrients) was more prevalent in 1945 in Ont. than last year, particularly in the old tobacco belt. Some cases were definitely due to excessive applications of fertilizer. In numerous instances the seedbeds were mildly affected and quickly recovered, due probably to changes in the weather. Such cases were often indicated only

by a patchy appearance of the bed. It is likely that the unusually low temperatures of early May contributed to the damage from yellow patch.

BLACK ROOTROT (Thielaviopsis basicola) caused some damage in seedbeds of burley and dark tobacco in Kent Co., Ont., but very little either in Essex Co. or in the new tobacco belt. Where this disease developed in permanent seedbeds unsatisfactory steaming at the edge of the bed was usually indicated. Only mild damage resulted from black rootrot in seedbeds in the Que. tobacco-growing districts.

DAMPING-OFF (Pythium sp., Rhizoctonia sp. etc.) was probably the most serious disease in Ont. early in the season. It has been observed that many growers using permanent seedbeds of the A-type are learning to control this disease to some extent by regulating the watering and ventilating. Mild damage from damping-off was experienced in Que. seedbeds.

BLACKLEG (Erwinia aroideae). Several cases were observed or reported in Kent Co., Ont., in cotton-covered seedbeds.

FRENCHING was observed in some seedbeds of flue varieties in the new tobacco belt of Ont. Damage was light.

MUSHROOMS again caused considerable damage in seedbeds of Kent Co. where manure is used in building the beds.

BLUE MOULD (Peronospora tabacina) was epidemic throughout the Ont. tobacco-growing districts close to Lake Erie for the first time in the history of Canadian tobacco growing. In the old tobacco district of Essex and Kent Co., where burley and dark tobacco types comprise most of the tobacco crop and where seedbeds are mostly of either the cotton-covered or sash-covered types, at least 95% of the seedbeds were affected by blue mould. Where glass-covered and cotton-covered beds both occurred on the same farm, almost invariably the cotton-covered bed was affected by blue mould either earlier or more severely than adjacent glass-covered beds. On the other hand, in the new tobacco belt where glass A-beds are invariably used, the initial outbreaks of the disease occurred at about the same time and spread more slowly than in the old belt. Moreover, though the transplanting season ended with the disease having covered the entire area of the new belt, the percentage of affected beds was lower than in the old belt despite the greater concentration of seedbeds. This was probably due to the higher temperatures prevailing in the glass A-beds and to the fact that both temperature and humidity can be controlled to some extent in this type of seedbed.

On the whole the 1945 acreage of burley tobacco in Essex and Kent Co. was somewhat reduced through either outright destruction of seedbeds by blue mould or a postponement of planting due to delayed recovery of infected seedlings. Definite cases of reduction in the acreage of flue tobacco due to blue mould infection were also reported in the old tobacco belt. The effect of the disease on the acreage of flue tobacco in the new belt is unknown.

Diseases in the Field

BLUE MOULD (Peronospora tabacina). As blue mould in North America has been, with few exceptions, almost exclusively a seedling disease it was expected that damage in Ont. would stop immediately the plants were transplanted to the field. However, this year many crops in the old tobacco belt, especially about Duart, Ridgetown and Harrow, showed the disease in the field in the form of large, necrotic spots up to about 1 in. diameter on the lower leaves. On the most severely diseased plants, even the uppermost leaves were affected, though here infection appeared as few to many bright yellow spots, indicating abortive infections that did not reach the fruiting stage.

Damage to tobacco in the field was considerably more extensive and widespread in the new belt than in the old and it was not uncommon for fields up to ten acres in size in certain districts of the new belt to show a high percentage of plants with one or more of their leaves affected in varying degrees by blue mould. Damage here, too, was much more extensive on the lower than on the upper leaves.

BROWN ROOTROT (cause undetermined) was somewhat more prevalent in the old tobacco belt than usual due probably to the high acreage of susceptible burley varieties. The new variety Haronova again appeared to possess some resistance though it is still somewhat uncertain. On experimental laboratory plots this year, the disease was most severe where no commercial fertilizer was added.

BLACK ROOTROT (Thielaviopsis basicola) was probably more severe in the new tobacco belt of Ont. than ever before. This may be accounted for by the low soil temperatures prevailing during the first month after transplanting. In Essex and Kent Co. damage from this disease was apparent only on heavier soils.

MOSAIC (virus) caused mild damage in both the old and new tobacco belts of Ont., where tobacco followed tobacco in the rotation. Both the common tobacco mosaic and cucumber mosaic could be found in many burley tobacco fields during the latter part of the season. In Que. mild damage from mosaic was reported.

STREAK (virus) occurred in mild form in the Erieau district of Kent Co. The disease can always be found in the above-mentioned district though not always in the same degree of severity.

FRENCHING (cause undetermined) was more prevalent than usual in the new tobacco belt of Ont. and cases were also not unusual in fields on the more poorly drained soils of Essex Co.

SORE SHIN (Rhizoctonia Solani) again caused some damage on the lightest soils of Essex Co. on flue-cured varieties. Usually this disease does not show up until after a windstorm which results in the "breaking-over" of affected plants at the ground level where the lesion develops.

ANGULAR LEAF SPOT (Pseudomonas angulata) caused negligible damage this year both in Ont. and Que., due probably to dry weather late in the

RING SPOT (virus) occurred on isolated plants in many fields of burley tobacco in the old tobacco belt of Ont. One field was seen in which about 150 plants were affected.

TOMATO

EARLY BLIGHT (Alternaria Solani). A slight infection was seen on 2 varieties at the Farm, Agassiz, B.C. (W. Jones). Infection was slight to moderate in a garden at Edmonton, Alta., and a trace in the plots at Lethbridge (M.W.C.). Early blight was quite general in Lincoln Co., Ont., but appeared to be of little importance (J.K. Richardson). A slight infection was recorded on several varieties at Macdonald College, Que. (R. Pelletier); infection was moderate on Early Chatham causing slight defoliation, and slight on later varieties at Ste. Anne de la Pocatière (R.O. Lachance). A slight infection was seen in 7 gardens in Queens Co., P.E.I. (R.R. Hurst).

NAIL-HEAD SPOT (Alternaria tomato). Infection was severe in a mixed planting at Waterville, N.S., particularly on one variety; the disease apparently started in the seed bed (J.F. Hockey).

GREY MOULD (Botrytis cinerea) destroyed up to 5% of the plants in poorly ventilated greenhouses in Essex Co., Ont. in Nov. 1945 (L.W. Koch).

LEAF MOULD (Cladosporium fulvum) was general and caused severe damage in 2 greenhouses at Harpole, B.C. A slight infection was noted on V-121, hitherto resistant, in a greenhouse at Victoria (W. Jones, W.R. Foster). Leaf mould was more severe in Essex Co., Ont., in Nov. 1945 than at any time since V-121 has been grown; greenhouse management affected the incidence of the disease to some extent (L.W. Koch). A rather severe outbreak occurred on a winter crop of Grand Rapids being grown at the Laboratory in early Dec. (J.K. Richardson). A moderate infection was seen, particularly on the lower leaves, of a plot of staked plants at St. Aubert, Que., on Sept. 16 (I.L. Conners).

ANTHRACNOSE (Colletotrichum phomoides) caused the rot of odd fruits both locally grown and imported at Winnipeg, Man.; spores 12.5-17.5 x 3.5-5 microns. The disease was not previously observed on the local crop (W.L. Gordon). Anthracnose caused the loss of 20% of the fruit of Bounty at Macdonald College, Que. It occurred on ripe fruits on the vine and on others ripening in baskets held in storage (R. Pelletier).

BACTERIAL CANKER (Corynebacterium michiganense) caused a trace to slight damage in greenhouses in Sask., and it was reported once or twice from farm gardens in 1944 and 1945 (R.J. Ledingham). The disease severely infected two 2-acre fields and two gardens at Marieville, Que. and 20-25% of the plants were killed by July 24; all the plants were from the same seed source (E. Lavallée). Canker also caused slight to moderate damage at the Montreal Botanical Garden (J.E. Jacques).

FUSARIUM WILT (F. Lycopersici). A field experiment in Essex Co., Ont., revealed that Fusarium wilt may be present without the symptoms being conspicuous. Losses due to decreased yields may, therefore occur without the

grower being aware of the cause. Specimens were received from one field of early tomatoes and the pathogen was isolated (J.J. Miller). Affected specimens were received from Colborne and Almonte, Ont. (L.T. Richardson).

ROOT KNOT (Heterodera marioni). Affected specimens were received from Toronto, Ont. (L.T. Richardson).

LATE BLIGHT (Phytophthora infestans). Infection was moderate on the fruit although light on the foliage at Dauphin, Man. The disease also affected a few green fruits in the plots at Winnipeg and was present on green fruit in storage at Gimli (J.E. Machacek). Late blight was reported to have caused severe damage (up to 80%) in two localities in Essex Co., Ont. (L.W. Koch, J.J. Miller). A loss of more than 50% of the crop was reported from one field of 300 plants in Russell Co., Ont. (H.N. Racicot, L.T. Richardson). Traces of late blight were found in a few fields at St. Martin, Laval Co., Que. (E. Lavallée). Late blight was very common on unsprayed tomatoes about Quebec City, but it was kept under control without difficulty where the vines had received the recommended treatments (O. Caron). A slight to moderate infection occurred on green fruit a week after they were brought indoors to mature at Ste. Anne de la Pocatière from an unsprayed plot; the loss was 30% (R.O. Lachance). Late blight occurred throughout N.B., but was less important than usual except in late-planted tomatoes. In preliminary experiments Dithane, applied as a spray, gave promising control (J.L. Howatt). Little or no damage from late blight occurred until late Sept. in N.S., when the loss became severe in green fruits ripening in storage sheds in Kings Co. (J.F. Hockey). A slight outbreak occurred in a greenhouse in April in P.E.I. but late blight was not observed in the field or garden in 1945 (R.R. Hurst).

BACTERIAL SPECK (Pseudomonas tomato) was severe on green fruit in a planting at Reston, Man.; infection was a trace only and not general at Morden (W.L. Gordon).

DAMPING-OFF (Pythium, Rhizoctonia, etc.) caused moderate damage in the early crop in Essex Co., Ont., the amount depending largely on the greenhouse management. In the outside beds of the late crop, destined for canning, damage was much lighter than usual (L.W. Koch). Damping-off caused the loss of half of 2000 plants in a hot bed in Lincoln Co.; cool weather and lack of sunshine contributed to the heavy loss (G.C. Chamberlain).

LEAF SPOT (Septoria Lycopersici) caused severe damage to the field crop in Essex Co., Ont., due to many of the plantings becoming severely defoliated with resultant shortening of the crop. It became severe in the field in June, earlier than usual because many of the seedlings showed infection before being transplanted. In turn this gave rise to severe local epidemics. The disease developed considerably later in sprayed than in unsprayed crops (L.W. Koch). Leaf spot was widespread about Colborne where it caused a moderate defoliation of the crop especially in plantings made before June 15-20. Nye State and Penn Hart appeared to be most susceptible, Rutgers and John Baer moderately susceptible, and Camdown resistant. A rather severe outbreak was also observed at Aldershot (G.C. Chamberlain). Although leaf spot was quite prevalent in Lincoln Co., it caused little concern (J.K. Richardson). Leaf spot was very heavy in one garden and

slight to moderate in several others near Ottawa, Ont. in August (D.B.O. Savile). Most fields were at least half defoliated at St. Martin, Laval Co., Que., at the beginning of September (E. Lavallée, R. Desmarteau). Similar observations were made at Macdonald College but not until mid-September (R. Pelletier).

WILT (Verticillium albo-atrum) was found in commercial greenhouse plantings in May at Vernon, B.C. (G.E. Woolliams).

BACTERIAL SPOT (Xanthomonas vesicatoria). A moderate to severe infection occurred on the fruit of several varieties at Lacombe, Alta. A bacterium resembling X. vesicatoria was isolated (M.W. Cormack). Some fruits severely affected by bacterial spot were seen in Essex Co., Ont., in Sept. (J.J. Miller).

MOSAIC (virus). All the plants were affected by mosaic in one large greenhouse at Victoria, B.C. (W.R. Foster). An inspection of a planting of tomatoes being grown for seed in Ont. revealed the following percentages of plants affected by mosaic: Stokesdale #4, 20%, plants severely stunted; Bounty 3.3%; Stokesdale 2.5%; Scarlet Dawn 2.1%; John Baer 1.5%; Rutgers trace; Best of All none (G.C. Chamberlain). In a field that had been in cucumbers in 1944, quite a number of John Baer plants developed mosaic of the shoe-string type (J.K. Richardson). An occasional diseased plant was seen in 3 plantings in Queens Co., P.E.I. (R.R. Hurst).

PURPLE TOP (virus) affected 6 plants in a plot at the Station, Fredericton, N.B. Scions from 2 of the plants were grafted to healthy tomato; a disease similar to that described in P.D.S. 23: 77 was produced (D.J. MacLeod).

STREAK (virus) due to mixture of Nicotiana virus 1 and Cucumis virus 1 in the fall greenhouse crops in Essex Co., Ont., shortened the picking period in Nov. 1945 to a considerable extent. Field tomatoes and cucumbers adjacent to the greenhouses appear to have been the source of the infection (L.W. Koch). The disease was seen at Ottawa East in July (L.T. Richardson).

YELLOW TOP (virus). Three plants showed a marked yellowing and dwarfing of the top leaves in a garden at the Station, Fredericton, N.B. A few axillary shoots also appeared in the middle or top axils of the affected plants. When scions from the affected plants were grafted to healthy tomatoes, a disease somewhat resembling witches' broom was produced (D.J. MacLeod).

BLOSSOM-END ROT (non-parasitic) was severe on Stemless Pennorange and Stemless Pennred, moderate, especially on the early fruit on Bonnie Best, and slight on Sioux Stokesdale, Sugawara and Early Chatham, at the Station, Saanichton, B.C.; a slight infection also occurred in local gardens (W. Jones, R. Adamson). Affected specimens were received from Dawson, Yukon, with the comment that it was very severe on Break O'Day; severe on Bonnie Best, Abel, Earliana, Marhis; slight on Grand Rapids and none on Marglobe (H.N. Racicot). Damage from blossom-end rot was much less on Bounty in the field in Essex Co., Ont., than in 1944. However, damage was considerable early in the fall on Vetomold 121 where heavy applications of manure were made or where the

plants were allowed to dry out; usually only the bottom sets were affected (L.W. Koch). Blossom-end rot affected one field at Laval des Rapides, Que. The plants were very close together and the under foliage damp (R. Desmarteau). The trouble was quite destructive in greenhouse tomatoes in Queens Co., P.E.I.; it also caused severe injury in field and garden, judging from the many reports and enquiries received (R.R. Hurst).

BLOTCHY RIPENING (non-parasitic) was severe in one greenhouse at Gordon Head, B.C. (W.R. Foster).

TURNIP

SCAB (Actinomyces scabies). A trace was observed on Laurentian at L'Islet, Que. (R.O. Lachance). Scab was severe in one field of Laurentian at New Perth, P.E.I. (E.B. McLaren).

GREY LEAF SPOT (Alternaria Brassicae). A slight infection was present on May 2 on the foliage of seed plants of several varieties at Saanichton, B.C. A slight infection was also recorded on the lower leaves and some pods in a seed crop of Canadian Gem at Milner (W. Jones).

GREY MOULD (Botrytis cinerea) was general on seed plants of Shogoin at Saanichton, B.C., as a leaf spot and die-back of the stems; the damage was rather severe (W. Jones).

DOWNY MILDEW (Peronospora Brassicae) caused 80% infection on the foliage of a Laurentian seed crop at Baxter's Harbour, N.S.; the damage was slight as the pods were already well formed. The fungus has been provisionally identified as P. Brassicae although the spores are considerably larger than the dimensions given in published descriptions and of the Peronospora on B. arvensis (J.F. Hockey, D.B.O. Savile).

BLACK LEG (Phoma lingam) was found affecting a few roots of Ditmars in one field only in Digby Co., N.S., (J.F. Hockey). Traces of black leg were found in one field on Sept. 27. However, the disease was reported from all 3 counties of P.E.I. Although affected roots may be only slightly damaged when placed in storage, they will eventually rot completely (R.R. Hurst).

CLUB ROOT (Plasmodiophora Brassicae). Several diseased specimens were brought in by a farmer, who reported the disease was causing heavy losses in his field at Rivière des Prairies, Que. (J.E. Jacques). Diseased specimens of Laurentian were brought in from a field in L'Islet Co. (R.O. Lachance). Clubroot affected 39% of the Laurentian roots in a field in Queens Co., P.E.I. This destructive disease is common on many farms (R.R. Hurst).

SCLEROTINIA ROT (S. sclerotiorum) was found attacking swede turnips in storage at Saskatoon, Sask. (R.J. Ledingham).

BLACK ROT (Xanthomonas campestris), as a leaf spot, caused a slight to moderate infection of all the plants in some areas and of 10-30% in the rest of a planting of Acadia grown for stecklings in the plots of the Division of Forage Crops, C.E.F., Ottawa, Ont. (R.G. Atkinson). Traces were observed in only one field of Laurentian in Queens Co., P.E.I. (R.R. Hurst).

STERILITY (virus). A trace was found in a seed plot at the Station, Fredericton, N.B.; 2-3% of the plants were affected in 4 plots examined in York Co. The same virus was found in broccoli, radish and wild radish (D.J. MacLeod). One field of Laurentian in N.S. showed 2% infection and a second 6% (J.F. Hockey).

ROOT NODULES (?virus). Numerous nodules were found on the main and secondary roots of 6 swedes and 2 turnips in a variety test at the Station, Fredericton, N.B. The nodular condition somewhat resembled clubroot, but no Plasmodiophora Brassicae could be demonstrated. Four of the affected swedes were removed to the greenhouse on Oct. 1. When they reached 6-8 in. in height the petioles were approach grafted to healthy swedes. In 106 days 2 of the swedes showed evidence of nodules on the secondary roots. No organism could be found in the nodules (D.J. MacLeod).

BROWN HEART (boron deficiency) was not in general as severe throughout the turnip districts of western Ont. as in 1944. It was, however, severe in localized areas especially among early turnips. Spraying is being generally adopted where equipment is available; the technique of mixing the borax spray has been improved and simplified. Dusting with borax gave such good results in 1944 that it was recommended as an alternative to spraying in 1945 (J.D. MacLachlan). Brown heart was severe in most fields where borax was not applied in York and Sunbury Co., N.B. Some farmers claim to have controlled the disease in fields of an acre or less by the application of 20-30 tons of manure per acre. It is estimated that about two-thirds of the 9300 acres in turnips are now planted on soil receiving a dressing of borax (D.J. MacLeod).

WITCHES' BROOM (cause undetermined). A severe witches' broom condition was found affecting 1% of the plants in a turnip seed plot in York Co., N.B. The plants developed a number of spindly axillary shoots with dwarfed leaves and flowers, and had a very bushy appearance. Most of the pods on the affected shoots were sterile (D.J. MacLeod).

VEGETABLE MARROW

LEAF SPOT (Alternaria sp.). Infection was general and damage considerable in oriental truck gardens at Marpole, B.C. (W. Jones).

POWDERY MILDEW (Erysiphe Cichoracearum) was general, but caused little damage at Brentwood, B.C. (W. Jones). Powdery mildew was general on White Bush vegetable marrow, but it was not observed on nearby Acorn squash and cucumber in a home garden at Summerland, B.C. (G.E. Woolliams).

IV. DISEASES OF FRUIT CROPS

A. POME FRUITS

APPLE

BRANCH ROT (Daldinia sp.). A split branch sent in from Magrath, Alta., bore Daldinia sp. (J.C. Broadfoot, I.L. Conners). A specimen of D. grandis on Dolga crab was received from Senlac, Sask., late in the season (T.C. Vanterpool).

FIRE BLIGHT (Erwinia amylovora) was prevalent and often severe, at Lethbridge and Edmonton, Alta. (M.N.C.). Only two cases were seen in Saskatoon, Sask. (R.J. Ledingham). A moderate infection was seen at Dauphin, Man., on crab-apples (J.E. Machacek). A trace of twig blight was seen on Secord at Collingwood, Ont. It had not previously been seen locally on this variety. No infection was seen on McIntosh and Delicious in the same block. An isolated block of 34 Yellow Transparent at Aldershot, 20 years old and growing vigorously, was very seriously damaged, with many dead branches and limb and trunk cankers; most of the trees will have to be cut out; damage was also heavy in 1944 (G.C. Chamberlain).

Blight was seen in many localities in Que., but the period of development was short and the damage less than in 1944 (F. Godbout). Specimens were received from Granby (L.T. Richardson). Blight was very heavy near Quebec City at the beginning of July, but stopped spreading by the end of the month. Fruit trees planted along highways have become a serious menace to neighbouring orchards (O. Caron). At l'Islet the worst outbreak for some years occurred. Twig and spur blight were both abundant in most small orchards and in a few commercial plantings. Trees that did not bloom were nearly free from infection. Crab-apples seem to have provided the inoculum (R.O. Lachance).

RUST (Gymnosporangium Juniperi-virginianae) was seen on red cedar and on apples in Elgin Co., Ont. It seems to be increasing there with the growing of susceptible varieties such as Jonathon and Grimes Golden (J.E. Howitt).

ANTHRACNOSE (Neofabraea malicorticis) was moderate on Cox's Orange, and slight on Jonathon, Wagner and Grimes Golden at the Station, Saanichton, B.C. (W. Jones).

PERENNIAL CANKER (Neofabraea perennans). Damage to trees in the Okanagan Valley, B.C., was slight, as in the last few years; but it is estimated that 40,000 boxes of Newton had to be repacked owing to infection that apparently occurred during wet weather at harvest (H.R. McLarty, R.E. Fitzpatrick).

HEART ROT (Pholiota squarrosa). The fungus was found fruiting in the crotch of a tree about 50 years old in an orchard at Lillooet, B.C. The tree had borne a large crop and appeared healthy (G.E. Woolliams).

CANKER (Physalospora obtusa and Valsa leucostoma). Cankers up to 15 inches long occurred on branches of Rhode Island Greening at St. Catharines, Ont., in March, 1945; infection was through stubs in which grafts failed to take in 1944 (G.C. Chamberlain).

BLACK ROT (Physalospora obtusa) severely affected a small number of Alexander fruit near Port Elgin, N.B. (S.F. Clarkson).

CROWN ROT (Phytophthora Cactorum). No change was seen in the general picture in the Okanagan Valley, B.C., about 2% of the mature trees being affected (H.R. McLarty, R.E. Fitzpatrick).

POWDERY MILDEW (Podosphaera leucotricha) caused considerable damage at the Station, Saanichton, B.C., especially to the new growth. Spraying alone has not proved very effective, since the fungus overwinters in the wood tissue; pruning of the affected current year's growth is advocated (W. Jones). Mildew was generally present in the Okanagan Valley; in some orchards it caused appreciable damage to susceptible varieties (R.E. Fitzpatrick, H.R. McLarty). McIntosh in York Co., N.B., showed up to 50% infection by P. sp. with slight to severe damage (S.F. Clarkson).

SCAB (Venturia inaequalis) was common on unsprayed trees in coastal B.C., but was well controlled by spraying at the Station, Saanichton (W. Jones). Infection was very light in the interior, and scab caused no commercial damage in the northern Okanagan Valley where sprays were applied (H.R. McLarty, R.E. Fitzpatrick). Scab was less severe than usual at Edmonton, Alta. It was light on crabs at Olds and heavy at Innisfail (M.W.C.). A trace was seen on a crab at Melfort, Sask. (H.W.M.). At Dauphin, Man., infection was slight on crabs; it was moderate on some leaves in a nursery at Gilbert Plains. At St. Norbert primary infection was found in a commercial orchard on June 26; the owner reported severe damage in 1943 and 1944 (W.L. Gordon).

Scab was severe in most districts in southern Ont. Infection was rampant on McIntosh shortly after bloom and developed freely throughout the summer. Defoliation was heavy in many orchards. In orchards with a set of fruit extra cover sprays were needed to protect it; but in many orchards, owing to frost, there was no fruit and spraying was evidently not thorough (G.C. Chamberlain). Scab was prevalent throughout Ont. It was probably the worst outbreak ever experienced. The only clean fruit was in orchards where spraying was very thorough and extra applications were made. Bordeaux seemed most effective late in the season; it caused some russetting but this was of little consequence this year (J.E. Howitt). Unsprayed McIntosh were severely defoliated at Ste. Anne de Bellevue, Que., but the disease was controlled by mild sulphur sprays (R. Pelletier). Infection in Que. was exceptionally severe and widespread. A few orchards were lightly infected, and some moderately so; but most showed heavy infection, often with almost complete defoliation. A wet spring made timely spraying difficult (F. Godbout). It was one of the worst seasons for scab in many years near Quebec City. Crops were not picked in many orchards. Some growers applied as many as 9-11 sprays and obtained profitable crops for their trouble (O. Caron).

In N.B. May was very wet, which favoured primary scab infection and made it practically impossible to apply the early sprays on time in large orchards. Consequently, scab was very prevalent in some commercial orchards and the apples harvested from them were not graded at harvest but were sold on the "tree-run" basis. The primary ascospore discharge occurred at Fredericton on May 7 during the pre-pink stage. Heavy ascospore discharges were recorded during the pink, advanced pink and bloom stages. Ferric

dimethyldithiocarbamate (Fermate) gave excellent control of scab again this year. Over a four year period this fungicide has given a superior grade of uniform, good-sized, well-coloured apples. Russeting was not a factor with the use of Fermate. It was clearly shown this year that Fermate may be applied during full bloom without either causing fruit russeting or reducing fruit set. This is important, as it is imperative to apply a fungicide at this time, during seasons with a long bloom period, to prevent primary infection (S.F. Clarkson).

The carry-over of scab in N.S. was considerably reduced in the spring. Perithecia were scarce in many orchards and the outlook early in the season was favourable to good control. Wet weather during May and June favoured the fungus and several periods of secondary spread occurred. By the end of June scab was severe on the foliage and during July and August many orchards suffered up to 75% defoliation from this cause. Spring frosts had reduced or eliminated crop prospects in so many localities that orchardists gave up fungicide applications. Those orchardists who continued spraying to protect their crop had from fair to excellent results in scab control. The orchards that suffered severe defoliation are expected to produce a very light crop, if any, in 1946 (J.F. Hockey).

In P.E.I. ascospore discharge was first seen June 18. Infection was moderate on McIntosh and wild apples and very heavy on an ornamental crab in Queens Co. Flotation sulphur was largely used and gave good control until late July when considerable infection showed up in commercial orchards (R.R. Hurst).

CRINKLE MOSAIC (?virus). A 12-year-old seedling at Fredericton, N.B., has shown for 6 years a severe crinkling, mottling and dwarfing of the leaves. The condition seems to limit growth and fruit production (D.J. MacLeod).

MOSAIC (?virus). A single Baldwin in Halton Co., Ont., showed a definite mosaic pattern, suggesting a virus; transmission tests are being made (G.C. Chamberlain). Three Bethel trees at the Station, Fredericton, N.B., have shown a well-defined interveinal mottling for 5 years. It does not seem to affect the growth of the trees (D.J. MacLeod).

BITTER PIT (non-parasitic). No serious bitter pit developed in storage in the 1944 crop in the Okanagan Valley, B.C. (H.R. McLarty, R.E. Fitzpatrick). Bitter pit was quite common in many parts of Ont. (J.E. Howitt). It was severe, affecting 100% of fruit, in Baxter in Queens Co., N.B. (S.F. Clarkson). Bitter pit was prevalent on Stark, Baldwin and Northern Spy in N.S., and some was seen on Cox Orange Pippin (J.F. Hockey).

DROUGHT SPOT AND CORKY CORE (Boron deficiency). No boron deficiency troubles were reported in the Okanagan Valley, B.C. in 1945 (H.R. McLarty, R.E. Fitzpatrick). The entire crop of a tree of Wolf River in Lincoln Co., Ont., was pitted and malformed (G.C. Chamberlain).

FLAT LIMB (Scion-stock incompatibility). A condition seen on 2-to 4-year-old limbs of Haas at Melvern Square, N.S., resembled flat limb of Gravenstein (J.F. Hockey).

FROST INJURY. Two commercial McIntosh orchards in York Co., N.B., were seriously damaged by frost in May. The leaves curled and blackened and some trees were wholly defoliated. The flower parts were killed and fell off (S.F. Clarkson).

LEAF SCORCH (cause unknown) did no serious damage in the Okanagan Valley, B.C., this year (R.E. Fitzpatrick, H.R. McLarty).

RUSSETTING (low temperature). A small percentage of McIntosh in Grey Co., Ont., showed heavy russetting due to cold weather during and just after bloom (G.C. Chamberlain).

SPRAY INJURY. In York, Sunbury and Queens Co., N.B., from a trace to 100% of McIntosh fruit was severely russeted, following the use of Bordeaux mixture (8-25-100 or 5-15-100) for the first cover spray (S.F. Clarkson).

WATER-CORE (non-parasitic) was slight on King and Charles Ross at the Station, Saanichton, B.C. (W. Jones). It was common on King in N.S. and was severe in some orchards (J.F. Hockey).

WINTER INJURY. At Meaford, Ont., 60% of a block of 40 8-year Delicious showed very serious injury to trunks and lower branches, including cankers and splitting and lifting of bark. About 40% of a block of Northern Spy showed slight to severe injury, especially about narrow crotches with bark inclusions; in some instances black rot and Cytospora enlarged the cankers (G.C. Chamberlain).

PEAR

FIRE BLIGHT (Erwinia amylovora). No serious outbreak occurred in the Okanagan Valley, B.C. (H.R. McLarty, R.E. Fitzpatrick). Damage was severe in the orchard at Lethbridge, Alta. (M.W.C.). A local outbreak in a block of Bartlett in Louth Twp., Ont., that was badly affected in 1943 and 1944 was initiated from cankers overlooked in pruning; exudation was seen on twigs and petioles. A Bartlett block in Grantham Twp. suffered severely from infection through spurs, resulting in the loss of large branches. Many infections were found in Bartlett and Gifford at the Vineland Horticultural Station, where blight has been serious for several years; spurs and branches were killed. Blight was less important in the Niagara Peninsula than in 1943 and 1944 (G.C. Chamberlain). Fire blight was prevalent in many sections of Ont. (J.E. Howitt).

STORAGE-ROT (Gloeosporium album) was found rotting Nova Scotia pears in storage at the Apple Exchange, Fredericton, N.B. (S.F. Clarkson).

RUST (Gymnosporangium sp.) occurred on the foliage of a few trees of Bartlett, Comice, Manilot and Marguerite at Victoria, B.C. (J. Hibbeson). G. clavipes was severe on Kieffer at Canard and Centreville, N.S., but none was seen on adjacent Bartlett and Clapp's Favorite (J.F. Hockey).

POWDERY MILDEW (Podosphaera leucotricha) did no serious damage in the Okanagan Valley, B.C. (H.R. McLarty, R.E. Fitzpatrick).

SCAB (Venturia pyrina) was unusually prevalent on unsprayed trees in coastal B.C. Infection was very slight on sprayed trees at the Station, Saanichton (W. Jones). Scab was serious in a small area in the Oliver district (R.E. Fitzpatrick, H.R. McLarty). A light crop on eight Flemish Beauty in Lincoln Co., Ont., was almost worthless because of scab; foliage infection was also heavy (G.C. Chamberlain). Scab was very severe in unsprayed orchards in Kings and Annapolis Co., N.S., but only a trace was seen in well-sprayed orchards (J.F. Hockey). A trace was seen on Flemish Beauty at Charlottetown, P.E.I. (R.R. Hurst).

STONY PIT (virus). No change in the situation observed in the Okanagan Valley, B.C. (R.E. Fitzpatrick, H.R. McLarty). Eight trees of Anjou and Flemish Beauty in a localized area of an orchard in Grantham Twp., Ont., bore fruit that was commonly pitted, malformed and worthless; the condition is thought to be due to the stony pit virus, but this has not yet been verified by transmission; boron applications in 1945 did not correct the condition (G.C. Chamberlain).

BLACK END (cause unknown) appeared to be more general on all varieties in the Okanagan Valley, B.C., than in 1944; it was definitely located on a tree on Pyrus communis roots (R.E. Fitzpatrick, H.R. McLarty).

STUNTING (infertility and root rot). One third of a block of 5 or 6-year Bartlett and Kieffer in Grantham Twp., Ont., showed severe stunting. The block had been excessively cultivated for some years. The poor growth of buckwheat and oats used as a cover crop indicated the low level of fertility in comparison with an adjacent peach orchard. Root development was poor, and many roots were partly brown and ended in bunchy tufts (R.S. Willison).

WIND DAMAGE. Extonsive injury to Bartlett and Anjou occurred in the more exposed orchards in the Niagara Peninsula, Ont., from high winds in May. Foliage was severely lacerated and showed marginal blackening. Apples also suffered some injury (G.C. Chamberlain).

B. STONE FRUITS

APRICOT

CORYNEUM SPOT (Clasterosporium carpophilum) caused no serious damage in the Okanagan Valley, B.C. (H.R. McLarty, R.E. Fitzpatrick).

BACTERIAL BLIGHT (Pseudomonas ?syringae). Considerable tip blight occurred on Chief at Gilbert Plains, Man. (W.A.F. Hagborg).

BLOSSOM and TWIG BLIGHT (Sclerotinia laxa) caused severe damage on one tree in a home orchard at Saanichton, B.C.; the pathogen was isolated from a twig (W. Jones).

CANKER (Valsa spp.). Valsa sp. (ident. R.S. Willison) was associated with a canker occurring at ground level on a tree at Lethbridge, Alta. (W.C. Broadfoot). In response to an enquiry, Dr. Willison states that apricots are subject to attack by the same Valsa spp. that attack peaches; little attention has been given to apricot canker in reports because apricots are of minor importance in Ont.; however, canker is not uncommon in them and large branches are sometimes killed.

BLACK HEART (Verticillium Dahliae). The disease seems to be dying out of the affected trees in the Okanagan Valley, B.C. See P.D.S. 24: 86. (R.E. Fitzpatrick).

RING SPOT (virus). No additional infections found in the Okanagan Valley, B.C. (T.B. Lott).

CHERRY

BLACK KNOT (Dibotryon morbosum). A specimen was received from Vancouver, B.C. (H.N. Racicot). A heavy infection was found on the new growth of a clump of P. pennsylvanica near Kingsmere, Que. Large branches and main trunks were also involved (R.G. Atkinson). Black knot was heavy on wild cherry in Prince Co., P.E.I. (R.R. Hurst).

LEAF SPOT (Higginsia hiemalis). A scattered infection on Montmorency in Niagara Twp., Ont., was causing yellowing and leaf-fall on June 20; early in July a moderate infection was seen in several orchards and nurseries of Montmorency in Lincoln Co., but damage was usually slight. Heavy rain of July 14-15 caused severe infection of unsprayed trees at Aldershot, but little was seen in an adjacent sprayed block. Late in the season leaf spot became heavy and widespread in the Niagara Peninsula, often causing complete defoliation. In the Laboratory orchard, St. Catharines, little was seen until late Sept. when heavy rain favoured infection (G.C. Chamberlain). Leaf spot was very prevalent on sour cherries and caused early defoliation in unsprayed orchards (J.E. Howitt).

BLOSSOM BLIGHT and STEM ROT (Sclerotinia fructicola). In Lincoln Co., Ont., infection was about 20% on Montmorency, the loss being mainly through stem rot; infection was about 2% on sweet cherries. Blossom infection was 12-20% on unsprayed trees in the Laboratory orchard, St. Catharines (G.C. Chamberlain).

LEAF BLISTER (Taphrina Cerasi) caused slight to moderate damage on a few trees in home orchards at Hope and North Saanich, B.C. (W. Jones).

LAMBERT MOTTLE (virus) was seen in some sweet cherry orchards not previously under observation in the Okanagan Valley, B.C. There are some suggestions of natural spread (T.B. Lott).

LITTLE CHERRY (virus). A few affected trees were seen in one orchard at Brentwood, B.C. (W. Jones). Little cherry is spreading rapidly; it appears to be general at Taghum, Nelson, Willow Point, Longbeach,

Balfour, Harrop and Procter, and to be patchy at Mirror Lake, Kootenay Bay, Crawford Bay, Gray Creek, Boswell, Creston, South Slocan, Bonnington and Robson. The rapid spread already seen in commercial orchards was repeated in the experimental orchard at Kootenay Bay; 19 trees were affected in 1944, and in 1945 all 46 bearing trees in the main part of the orchard showed the disease (W.R. Foster). Surveys in collaboration with W.R. Foster, show this disease to be spreading at a serious rate. Since 1933 it has spread 20 miles north and at least 15 miles west, and has crossed the main Kootenay Lake to reach the Creston district 45 miles southeast. Orchards may become completely infected in 2 years or less (T.B. Lott).

RASP LEAF (virus). No new infections were seen in the Okanagan Valley, B.C. (T.B. Lott).

TWISTED LEAF (virus). No new infections were seen in the Okanagan Valley, B.C. (T.B. Lott).

YELLOWS (virus). Fifty per cent of the trees of Montmorency in an orchard in Stamford Twp., Ont., were infected and showed heavy defoliation by June 18. Infection is general in the district (G.C. Chamberlain).

CRACKING and SPLITTING (wet weather). Up to 75% of the fruit of sweet cherry varieties in Lincoln Co., Ont., showed cracking after the rains of July 14-15 as the fruit was swelling. Similar but much less extensive injury occurred on sour cherries. The trouble was common throughout the Niagara Peninsula (G.C. Chamberlain).

FERTILIZER BURN. Heavy defoliation of 7-year-old Montmorency in Grey Co., Ont., resulted from the application of 2 lb. cyanamid per tree early in the spring; affected leaves were orange-yellow with a marginal scorch (G.C. Chamberlain).

RUSSETING (low temperature). Much of the fruit of Early Richmond sweet cherries was uneven, malformed and russeted as a result of low temperatures during bloom; the extent of the injury varied in different parts of the Niagara Peninsula, Ont. (G.C. Chamberlain).

SUN SCALD. Severe bark splitting occurred on the southwest side of the trunks of 30% of Montmorency in Grey Co., Ont. (G.C. Chamberlain).

NECTARINE

DIE-BACK (Valsa leucostoma) was seen on a few trees in a home orchard at Cobble Hill, B.C. (W. Jones, R.S. Willison).

PEACH

SCAB (Cladosporium carpophilum). A moderate infection was found on Elberta occasionally in Niagara Twp., Ont. It was very prevalent and serious on St. John and Crawford in Middlesex Co., affecting 75% of the fruit (G.C. Chamberlain).

BLIGHT (Clasterosporium carpophilum) caused slight twig damage in a garden in N. Saanich Co., B.C. (W. Jones).

BLOSSOM BLIGHT and BROWN ROT (Sclerotinia fructicola). In the Laboratory orchard, St. Catharines, Ont., Rochester showed 4-22% blossom blight and Elberta 4-14.5%. Blossom sprays gave some reduction in blossom infection, but did not give complete control. Bloom started early, but a prolonged cool, wet spell set in when half the blossoms were open; as a result the bloom period was extended and fairly favourable for infection, and sprays were ineffective unless repeated. Brown rot infection was variable, but was in general high. Control was made difficult by the high incidence of damage by fruit moth and other insects. Although the summer was not excessively wet, considerable rot developed in green fruit, mostly in association with insect punctures. Consequently inoculum was abundant when the fruit ripened and brown rot was prevalent at harvest (R.S. Willison). Brown rot caused much loss in canning peaches brought into P.E.I. (R.R. Hurst).

POWDERY MILDEW (Sphaerotheca pannosa) caused little if any economic damage in the Okanagan Valley, B.C. (R.E. Fitzpatrick, H.R. McLarty).

LEAF CURL (Taphrina deformans) was prevalent in most home gardens in coastal B.C., where control measures were not applied (W. Jones). A specimen was received from Lillooet with the statement that the disease was serious there for the first time (H.N. Racicot). No serious outbreaks were reported in the Okanagan Valley (R.E. Fitzpatrick, H.R. McLarty). Severe outbreaks of leaf curl were seen on Elberta in Lincoln Co., Ont., in a few orchards where the dormant spray was applied late. Specimens of infected fruit of Vidette and Rochester were received in July; leaf infection had been moderate earlier (G.C. Chamberlain). Leaf curl was seen to have defoliated many trees in unsprayed orchards in various districts (J.E. Howitt). Leaf curl was severe on unsprayed trees in Kings Co., N.S. (J.F. Hockey).

BACTERIAL BLIGHT (Xanthomonas pruni). Minor leaf infection occurred in a block of Elberta in Lincoln Co., Ont. The grower applied extra cover sprays of zinc sulphate--lime. Pruning back of terminals is also thought to have been a factor in reducing the incidence of the disease in this orchard (G.C. Chamberlain).

BLOTCH (virus). Symptoms were found on one water sprout on a tree of Marigold in an orchard near Bartonville, Ont. Inoculation has shown that the disease is transmissible, but it is not yet certain whether it is identical with that under observation at the Laboratory, St. Catharines, for several years. The variegation crops up erratically, almost suggesting a transmissible bud-sport variegation (R.S. Willison).

WESTERN X DISEASE (virus). In collaboration with W.R. Foster, Provincial Dept. of Agriculture, a survey was made in five sections of the Oliver and Osoyoos districts, B.C., in which 35,469 trees were examined and 516 were found to be diseased. The rate of disease (1.45%) is only slightly higher than that found in a less extensive survey of the area in 1940. Compulsory eradication has not been adopted but many growers are

removing some or all affected trees, which partly accounts for the small increase in the amount of the disease. Observations in the orchards mapped in 1940 show that a few new infections occur each year. The effect varies from tree to tree, but generally diseased trees are of little value (T.B. Lott, F.C. Mellor).

X DISEASE (virus). In orchards under survey in Niagara Twp., Ont., newly infected trees were found as follows:

Trees in orchard	Newly Infected Trees	
	Number	%
288	1	0.35
280	0	0.0
419	5	1.24
143	0	0.0
800	1	0.12

(R.S. Willison, G.C. Chamberlain).

BORON DEFICIENCY. Considerable die back occurred in some peach orchards in the Okanagan Valley, B.C., where boron had not been applied within 3 years (H.R. McLarty, R.E. Fitzpatrick).

SPRAY INJURY. Elberta, Rochester and Veteran in Louth Twp., Ont., suffered 75% defoliation following the omission of lime from the zinc sulphate shucks spray. Injury was evident three days after the application and defoliation continued for a week (G.C. Chamberlain).

PLUM

CROWN GALL (Agrobacterium tumefaciens). Fifteen out of 100 trees of Fellenberg prune received from a nursery in Lincoln Co., Ont., bore galls at the crown (G.C. Chamberlain).

SHOT HOLE (Cercospora circumscissa). Infection was heavy on leaves in a planting at St. James, Man. (J.E. Machacek). This is the first record on plum in Man.; previously reported on the plum x cherry hybrid, Opata (W.L. Gordon).

BLACK KNOT (Dibotryon morbosum) was seen in small orchards throughout Ont., and seems to be increasing where owners are failing to cut out the knots (J.E. Howitt). A specimen was received from Kingsmere, Que. (H.N. Racicot). Damage was severe in Queens Co., P.E.I., and several enquiries about the disease were received (R.R. Hurst).

SHOT HOLE (Higginsia prunophorae) was severe on Santa Rosa, Becky Smith, Beauty and Maynard, and moderate on Burbank and Albion at the Station, Saanichton, B.C. (W. Jones). Specimens of affected Tecumseh, Mina and Radisson were received from St. Hubert Mission, Sask. (L.T. Richardson).

SHOT HOLE (Phyllosticta circumscissa). Many leaves were severely affected at Gilbert Plains, Man.; the tissue had fallen away to a large extent (W.A.F. Hagborg, W.L. Gordon).

BLOSSOM BLIGHT and BROWN ROT (Sclerotinia fructicola). The average infection in a block of Grand Duke in Lincoln Co., Ont., was 3.4%; infection ran as high as 10% (G.C. Chamberlain). A specimen of rotted blue plum was received from Kingsmere, Que. (H.N. Racicot). Infection was heavy on Victoria in Queens Co., P.E.I. (R.R. Hurst).

BLOSSOM and TWIG BLIGHT (Sclerotinia laxa) was severe on Santa Rosa, Yellow Egg, Monarch, Burbank, Black Diamond, Peach and Micholson at the Station, Saanichton, B.C. (J. Bosher).

PLUM POCKET (Taphrina spp.). T. ?Pruni affected a few trees in a home orchard at New Westminster, B.C. (W. Jones). Specimens of T. communis were sent from Acme, Alta., (G.B. Sanford); a light infection occurred at Indian Head and Stevon, Sask. (H.W.M.), and it was seen at Nipawin (T.C. Vanterpool); specimens were received from North Bay and Kenora, Ont. (H.N. Racicot); a heavy infection was reported in one orchard in P.E.I. (R.R. Hurst).

PRUNE DWARF (Prunus virus 6). Two trees out of 50 of Follenberg in an orchard in Niagara Twp., Ont., showed stunted growth and a marked dwarfing and narrowing of the leaves (G.C. Chamberlain).

CHLOROSIS (lime-induced) was severe in occasional plantings near Winnipeg, Man. (J.E. Machacek).

RUSSETING (low temperature). All plums and prunes showed a large amount of russeting in the Niagara Peninsula, Ont., due to low temperatures at blossom time. Gueii proved very susceptible and in Monarch and Reine Claude 40-50% of the fruit was affected (G.C. Chamberlain).

SPRAY INJURY. Lime-sulphur injury was severe and general in an orchard in Queens Co., P.E.I. (R.R. Hurst).

SAND CHERRY

BROWN ROT (Sclerotinia fructicola) caused abundant twig and fruit infection and gummosis on Prunus Besseyi at Dropmore, Man. (W.A.F. Hagborg).

C. RIBES FRUITS

CURRANT

WHITE PINE BLISTER RUST (Cronartium ribicola) was general on red currant in a few gardens at Westholme, B.C. It caused slight damage to black currant at Saanichton (W. Jones). Rust was severe on Boskoop Giant at Goderich, Ont. (G.C. Chamberlain). Many reports were received of severe damage to black currants from different parts of Ont. (J.E. Howitt). Rusted

black currant leaves were received from Ottawa (L.T. Richardson). Black currants at Ste. Anne de Bellevue, Que., showed 90% infection (R. Pelletier). Rust was very heavy on black currants on the Island of Orleans; it appears to be uncontrollable owing to the proximity of diseased pines, and control experiments have been given up (O. Caron). A trace was seen on black currant in Queens Co., P.E.I. (R.R. Hurst).

ANTHRACNOSE (Drepanopeziza Ribis) caused severe defoliation in Kings Co., N.S., and was also reported from Lockeport (J.F. Hockey).

SEPTORIA LEAF SPOT (Mycosphaerella Grossulariae) was heavy on many leaves at Dropmore, Man. (W.A.F. Hagborg). It was prevalent in southern Ont., and caused severe defoliation in nursery plantings of various varieties (G.C. Chamberlain).

CLUSTER CUP RUST (Puccinia Pringsheimiana) was reported on black currants from Goodsoil, Sask. (T.C. Vanterpool).

GOOSEBERRY

WHITE PINE BLISTER RUST (Cronartium ribicola) was very light on a few bushes of Poorman at Saanichton, B.C. (W. Jones).

ANTHRACNOSE (Drepanopeziza Ribis). Affected specimens of Pixwell were received from St. Hubert Mission, Sask. (L.T. Richardson).

SEPTORIA LEAF SPOT (Mycosphaerella Grossulariae). Affected leaves of Pixwell were received from St. Hubert Mission, Sask. (L.T. Richardson).

DOWNY MILDEW (Plasmopara ribicola Schroet.). A few leaves on which the fungus was fruiting heavily were received from Beeton, Ont. (J.D. MacLachlan). First Canadian record of this fungus.

POWDERY MILDEW (Sphaerotheca mors-uvae). Late infection severely damaged young plants at Lockeport, N.S.; infection was moderate to severe on plants near Meteghan in July (J.F. Hockey).

D. RUBUS FRUITS

BLACKBERRY

ORANGE RUST (Gymnoconia Peckiana) affected 20% of the stools of a planting of Lawton in Niagara Twp., Ont., causing serious stunting (G.C. Chamberlain).

LOGANBERRY

DRY BERRY (Haplosphaeria deformans) caused up to 30% loss in some plantings on Vancouver Island, B.C. (W. Jones).

RASPBERRY

CROWN GALL (Agrobacterium tumefaciens). An entire plantation of Viking was severely damaged in Queens Co., P.E.I. (R.R. Hurst).

GREY MOULD (Botrytis cinerea). Moulded berries were received from Cornwall, Ont. (H.N. Racicot).

SPUR BLIGHT (Didymella applanata). Moderate damage was found in a planting at Red Deer, Alta. (A.W. Henry). Infection was heavy in a planting at St. Andrews, Man.; anthracnose was also present and damage was severe (W.L. Gordon). In late April extensive lesions, resulting in death of the cane, were seen on 10% of a Cuthbert planting in Niagara Twp., Ont. The planting was very weedy in 1944. Spur blight was very common on Latham, Cuthbert and Taylor, especially where the rows were thick, in the Niagara Peninsula. It is an important factor in propagating beds (G.C. Chamberlain). The disease was seen in many plantations, and many specimens of affected canes were received (J.E. Howitt). This disease is common in the region of Quebec City (O. Caron). Affected specimens were received from St. Lambert and Sherbrooke, Que., and Dorchester, N.B. (H.N. Racicot). Spur blight was seen in 12 plantings in P.E.I.; it caused very severe damage in an old Viking plantation (R.R. Hurst).

ANTHRACNOSE (Elsinoe veneta) was moderate on Madawaska and slight on Gatineau at the Experimental Farm, Agassiz, B.C. (W. Jones). Heavy infection was noted at St. Andrews, Man., together with spur blight (W.L. Gordon). In Lincoln and Wentworth Co., Ont., extremely severe outbreaks of this disease were found in several commercial plantings of Taylor and in nursery plantings of Madawaska. In Taylor the fungus kills the cane tips; it is also commonly found on the leaf blades and petioles, causing a shrivelling and defoliation. On other varieties the disease is less common and of minor importance (G.C. Chamberlain). Lightly infected canes were received from St. Lambert, Que. (H.N. Racicot). Anthracnose was very common in the region of Quebec City (O. Caron).

CANE BLIGHT (Leptosphaeria Coniothyrium). A moderate infection was seen in a planting at Woodlands, Man. (J.E. Machacek).

SEPTORIA LEAF SPOT (Mycosphaerella Rubi) was moderate on Washington and slight on Rideau, Trent and Madawaska at the Experimental Farm, Agassiz, B.C. (W. Jones). Leaf spot was present in a clump of canes at St. Norbert, Man., that had been damaged by a foot rot (W.L. Gordon).

YELLOW RUST (Phragmidium Rubi-idaei). Previously Washington has proved resistant to this disease when growing adjacent to rusted Cuthbert. This year yellow rust caused considerable damage in two plantings of Washington at Agassiz and Lulu Island, B.C. (W. Jones).

LATE YELLOW RUST (Pucciniastrum americanum) was common on the foliage of a 5-acre planting of Viking at Penetang, Ont., in Sept., but caused little damage (G.C. Chamberlain).

POWDERY MILDEW (Sphaerotheca Humuli) was very common and caused marked stunting of the cane tips in a large propagating bed of Latham at Campbellford, Ont. Mildew is commonly seen in Latham plantings; it is also occasionally found on Viking, causing a "rat-tail" growth of cane tips (G.C. Chamberlain).

WILT (Verticillium albo-atrum). Scattered infections were found in Viking plantations in Ont., causing wilting and death of a small percentage of the stems (G.C. Chamberlain). A small patch of black raspberries at Wolfville, N.S., was almost wiped out. Fusarium sp. fruited on the stems, but Verticillium predominated in roots and stem bases (J.F. Hockey).

DECLINE (virus) was present, in diminishing sequence, on Washington, Rideau, Ottawa, Gatineau, Trent and Madawaska at the Experimental Farm, Agassiz, B.C. (W. Jones).

LEAF CURL (virus). A planting was moderately affected at Edmonton, Alta. (A.W. Henry). Small amounts were found in Ont. in plantings of Cuthbert, Viking and Latham; its occurrence in the latter two varieties is unusual (G.C. Chamberlain). Three affected plants were seen in one small planting and 4 in another at Fredericton, N.B. (D.J. MacLeod). Two per cent of the canes were infected in a new planting of Viking at Berwick, N.S. (J.F. Hockey).

MOSAIC (virus). Infection was 60% in Ottawa and 10% in Gatineau at the Experimental Farm, Agassiz, B.C. (W. Jones). About 30% infection was seen in a planting at Lethbridge, Alta. (W.C. Broadfoot). Mosaic is readily found in Ont. in the older plantings of Latham. A 5-year-old ½ acre Viking plantation at Cooksville showed 40% infection; diseased plants suffered marked stunting and crop reduction (G.C. Chamberlain). A Latham planting at Maugerville, N.B. showed 2% infection. Infection was 4% in a Viking planting at Springhill. Mosaic was common on wild raspberry in York, Sunbury, Queens, Westmorland, Carleton, Victoria and Gloucester Co. (D.J. MacLeod). Three per cent infection occurred in a small Viking planting at Berwick, N.S. (J.F. Hockey). Traces of mosaic were found in 3 plantations in P.E.I. (R.R. Hurst).

WINTER KILLING. One Viking planting in Queens Co., P.E.I., was severely damaged; O 263 at the Station, Charlottetown, suffered considerably and Fusarium sp. grew copiously on the dead canes; in general, damage to raspberries was light (R.R. Hurst).

E. OTHER FRUITS

BLUEBERRY

WITCHES' BROOM RUST (Calyptospora Goeppertiana). A 90% infection was noted at Herring Cove, N.B. (J.L. Howatt).

GRAPE

DEAD ARM (Fusicoccum viticola). Scattered infections were seen on Concord in Niagara Twp., Ont. It is becoming more serious in a number of vineyards (G.C. Chamberlain).

ANTHRACNOSE (Gloeosporium ampelophagum (Passer.) Sacc.). Specimens were received from unsprayed grapes at Woodville, N.S. (J.F. Hockey). This is the first report to the Survey of this fungus, which is believed to be a stage of Elsinoe ampelina Shear.

BLACK ROT (Guignardia Bidwellii). Specimens were received from London, Ont. (L.T. Richardson).

DOWNY MILDEW (Plasmopara viticola) was moderately heavy on Concord in a vineyard in Lincoln Co., Ont., in July, causing shelling as a result of pedicel infection. It was also serious on adjacent Fredonia. Downy mildew destroyed all fruit clusters on 50 vines of Fredonia in Brant Co. (G.C. Chamberlain). It was common on unsprayed grapes in the Ottawa district, but was much less serious than in 1943 (D.B.O. Savile). Specimens were received from Buckingham and Howick Station, Que. (L.T. Richardson).

POWDERY MILDEW (Uncinula necator) was again present on European varieties in the Experimental Farm vineyard, Summerland, B.C. (H.R. McLarty).

CHLOROSIS. A chlorosis of unknown cause, but apparently nutritional, was seen on Concord and Niagara in many orchards in the Niagara Peninsula, Ont. Its occurrence is quite localized and is generally on high ground (G.C. Chamberlain).

STRAWBERRY

GREY MOULD (Botrytis cinerea) was severe at Steinbach, Man., following hot, wet weather (J.E. Machacek). In a vigorously growing plantation of Premier near an old plantation in Louth Twp., Ont., a 10% infection occurred. Rot of green fruit was common; infection often spread into the fruit from sepals or pedicels (G.C. Chamberlain).

LEAF SCORCH (Diplocarpon Earliana). Infection was moderate on British Sovereign and nil on Marshall, Gem and Rockhill at the Experimental Farm, Agassiz, B.C. (W. Jones).

LEAF SPOT (Mycosphaerella Fragariae) was moderate on Marshall and Gem at the Experimental Farm, Agassiz, B.C. (W. Jones). Leaf spot was very prevalent on numbered varieties in a trial planting at the Laboratory, St. Catharines, Ont. (G.C. Chamberlain). A specimen was received from Parisville, Que. (H.N. Racicot). Infection was a trace to heavy on Senator Dunlap in Queens Co., P.E.I. (R.R. Hurst).

RED STELE (Phytophthora Fragariae Hickman). In April, 1945, oospores identical with those described by C.J. Hickman (The red core root

disease of the strawberry caused by Phytophthora Fragariae n.sp. Jour. Pomol. and Hort. Sci. 18: 89-118. 1940) were found in diseased strawberry roots at Ladysmith, Bradner and Abbotsford, B.C. The symptoms are those described by Hickman. The dark red colour of the centre of affected roots is considered a reliable symptom; it is distinct in spring, fall and winter. The disease seems to be widely established in the Fraser Valley; it was also found to be causing considerable damage at Willow Point and Wynndel in the Kootenays, and was found in one patch out of ten inspected on Vancouver Island. Mr. G.E.W. Clarke estimated a loss of 600 tons, or 20% of the crop, in the Fraser Valley (W.R. Foster).

POWDERY MILDEW (Sphaerotheca Humuli) caused slight damage in several plantings of Premier in Lincoln Co., Ont. (G.C. Chamberlain).

WITCHES' BROOM (virus). Moderately affected plants were seen at Edmonton, Alta. (A.W. Henry).

JUNE YELLOWS (genetic breakdown) was frequently seen in new plantings of Premier in the Niagara Peninsula, Ont. It is very prevalent in the Waterford district where many growers obtained their planting stock (G.C. Chamberlain). A planting of Premier at Cambridge, N.B. showed 95% yellows (D.J. MacLeod). This condition was more severe and general this spring in Kings Co., N.S., than ever before. Entire fields of Premier were affected. No field of this variety was found free of the trouble, but other varieties were mostly unaffected (J.F. Hockey).

ROOT ROT (cause unknown). Infection was 30% in one planting of Premier in Niagara Twp., Ont.; the disease was most severe in low areas; affected plants made poor growth and lacked runners (G.C. Chamberlain). The disease was seen in many strawberry plantations; an unusual feature was that it often attacked young plants that had just been set out (J.E. Howitt). Infection was about 25% in a number of varieties in the test plots at Ste. Anne de Bellevue, Que. (R. Polletier). As many as 50-100% of the plants showed severe injury in some plantings of Senator Dunlap, Premier and Catskill, in York and Queens Co., N.B. (S.F. Clarkson).

V. DISEASES OF TREES AND SHRUBS

ABIES - Fir

Tip Blight (Rehmiellopsis balsameae Waterman). This blight was reported in P.D.S. 24: 98 as due to R. bohemica. Alma M. Waterman (Journ. Agr. Res. 70: 315-337. 1945) has now shown the tip blight of Abies in eastern North America to be due to a distinct fungus, which she has named R. balsameae, and which she believes to be native to this region and to have spread to those species planted for ornament from A. balsamea. She also notes that specimens collected by Faull in Ont. and Que. with immature fruit bodies are probably R. balsameae, and that the only known North American material of R. Abietis (E. Rostr.) O. Rostr. (R. bohemica Bub. & Kab.) consists of 2 specimens collected on A. lasiocarpa in B.C. by L.N. Gooding and J.W. Kimmey.

ACER - Maple

Leaf Spot (Phleospora Aceris (Lib.) Sacc.). Study of further material, including the type of Ascochyta Aceris Lib., has made it plain that many, at least, of the organisms grouped by Gilman and Archer (The fungi of Iowa parasitic on plants. Iowa State College Journ. of Sci. 3: 299-502. 1929) under Septoria Aceris are indeed identical; however, this variable fungus appears to us better placed in Phleospora than in Septoria. Accordingly under this name are to be included fungi previously reported in the Survey as Cylindrosporium consociatum, C. pennsylvanicum, Phleospora Aceris, Phyllosticta minutissima and Septoria acerina. Without more definite evidence we hesitate to include Septoria Negundinis on A. Negundo. It should be pointed out that Phyllosticta minutissima may be more than a microconidial stage; material collected in early Sept. at Rupert, Que. was severely damaged (P.D.S. 23: 94) yet no trace of the Phleospora acervuli could be found, strongly suggesting that the Phyllosticta spores had served as true conidia (D.B.O. Savile, I.L. Conners). P. Aceris caused moderate damage to A. pennsylvanicum and A. spicatum at Elgin Road, Que.; the microconidial stage was also present (I.L. Conners).

Tar Spot (Rhytisma acerinum) was light on A. rubrum at Elgin Road, Que. (I.L. Conners).

Leaf Scorch (cause undetermined) was severe on A. ginnala at Brandon, Man., in 1944 (W.L. Gordon). Dr. Gordon suggested that this might be Phyllosticta minima as some pycnidia were present with spores 4.5-7.5 x 2.0-3.8 microns; these figures agree with those given by Bisby et al. (Fungi of Manitoba and Saskatchewan. 1938), whose material may have been this fungus, and of Seaver (N. Am. Flora 6: 50); but, as shown in P.D.S. 23: 94, P. minima is quite different. The fungus in Dr. Gordon's material is fruiting sparsely, being no more abundant than Alternaria sp. on the same lesions, and the fully mature spores are pale yellowish brown; it is suspected that this is a saprophytic or weakly parasitic Coniothyrium following a physiological disorder (D.B.O. Savile).

AESCULUS - Horsechestnut

Leaf Scorch (alkaline soil). Trees of A. glabra at Greenway, Man., showed slight scorching after a dry spell (J.E. Machacek).

AMELANCHIER

Witches' Broom (Apiosporina Collinsii) was seen on a few bushes of A. florida at North Saanich, B.C. (W. Jones).

Rust (Gymnosporangium corniculans). The pycnial stage was common on leaves of A. alnifolia in a nursery at Dropmore, Man., close to junipers; see also Juniperus.

Leaf Spot (Entomosporium maculatum). A. alnifolia at Dropmore, Man., was lightly infected (W.A.F. Hagborg, W.L. Gordon).

BETULA - Birch

Leaf Spot (Septoria Betulae) was heavy on B. alba in a nursery at Dropmore, Man. (W.A.F. Hagborg, W.L. Gordon).

CARAGANA

Leaf Spot (Septoria Caraganae). Infection was light but general in hedges at Edmonton, Alta. (M.W.C.).

CORNUS - Dogwood

Leaf Spot (Septoria cornicola) affected many leaves of Cornus sp. in a nursery at Dropmore, Man.; C. stolonifera was moderately to severely attacked (W.A.F. Hagborg, W.L. Gordon).

CRATAEGUS - Hawthorn

Rust (Gymnosporangium spp.). Pycnia and aecia of G. Betheli were seen on Crataegus sp. at Dropmore, Man., some 300 yards from infected J. scopulorum (W.A.F. Hagborg, W.L. Gordon). Fruits of Crataegus sp. infected by G. clavipes were received from Bewdley, Ont. (Ruth Macrae, I.L. Conners). G. clavariaeforme attacked C. Oxyacantha var. rosea at Charlottetown, P.E.I. (R.R. Hurst).

ELAEAGNUS

Leaf Spot (Phyllosticta argyrea Speg.). A slight infection occurred on E. angustifolia at Dropmore, Man.; spores 4-5 x 1-2 microns. Previously found at Mordon (W.L. Gordon).

Bacterial Leaf Spot (? Pseudomonas elaeagni) was found on some leaves of E. angustifolia at Dropmore, Man.; the same disease was found at Mordon in 1944 (W.A.F. Hagborg, W.L. Gordon).

Rust (Puccinia Caricis-Shepherdiae). Traces were present on E. angustifolia at Dropmore, Man.; first record on this host in Man. (W.L. Gordon).

FAGUS - Beech

Massaria salliformis Wehmeyer was collected on bark of F. grandifolia at Kentville, N.S., by R.M. Lewis; it was determined by L.E. Wehmeyer. This interesting fungus causes the affected bark to take on a greenish shade like that of poplar. It is not known whether it causes any appreciable injury (I.L. Connors).

FRAXINUS - Ash

Rust (Puccinia sparganioides) was abundant on F. pennsylvanica var. lancoolata in York and Queens Co., N.B. (J.L. Howatt).

JUGLANS

Leaf Spot (Marssonina Juglandis) caused much defoliation of J. cinerea near Pink Lake, Que. (D.B.O. Savile).

Canker (Melanconis Juglandis (Ell. & Ev.) Graves). Melanconium oblongum Berk., with a little of the perfect stage Melanconis Juglandis, was found in abundance on a branch of J. cinerea near Pink Lake, Que., that was broken over but still attacked. The staghorn effect commonly seen on butternuts in this district may be largely due to the disease caused by this organism and described by A.H. Graves (Phytopath. 13: 411-435. 1923). The pathogen is closely related to Melanconis Carthusiana Tul. (Melanconium Juglandinum Kunze) on J. regia in Europe. The conidial stage of the latter (D. Sacc. Myc. Ital. 178) was examined, and, as L.E. Wehmeyer (Univ. Mich. Studies. Sci. Studies 14: 39. 1941) remarks, the conidia were somewhat broader than in Melanconium oblongum. Graves reports having seen two Canadian collections: London, May 13, 1892; and no definite locality, Feb. 11, 1893, Macoun (I.L. Conners).

Bacterial Blight (Xanthomonas juglandis) caused slight damage to foliage and fruit of J. regia at Saanichton, B.C. (W. Jones).

JUNIPERUS

Rust (Gymnosporangium spp.). Galls of G. Betheli were common on J. scopulorum at Dropmore, Man., 300 yards from rusted Crataegus (W.A.F. Hagborg, W.L. Gordon). G. clavariaeforme caused slight damage to J. communis at Kentville, N.S. (R.M. Lewis). Specimens of G. ?corniculans on J. scopulorum were received from Indian Head, Sask. (I.L. Conners). G. corniculans was common on J. horizontalis, J. horizontalis var. Douglasii and J. virginiana at Dropmore, Man.; see also Amelanchier (W.A.F. Hagborg, W.L. Gordon).

OSTRYA - Hop-Hornbeam

Leaf Blister (Taphrina virginica Seym. & Sadeb.) was received from Perrytown, Ont., on O. virginiana (Ruth Macrae). We have one previous specimen from Ont., but this is the first report to the Survey.

PICEA - Spruce

Rust (Chrysomyxa ledicola). A specimen on P. glauca was received from Hodgson, Man., with the statement that some trees were being seriously defoliated (W.L. Gordon). A specimen of rusted blue spruce (? P. pungens var. glauca) was received from the Station, Lennoxville, Que. (I.L. Conners).

PINUS - Pine

Rust (Coleosporium Solidaginis). Narrow yellowish bands appeared on some needles of P. Banksiana and P. sylvestris planted at the University, Fort Garry, Man. These bands were similar to those produced on P. sylvestris in the greenhouse shortly after inoculation from rusted Aster and Solidago. Similar bands were seen on P. sylvestris at Dropmore (A.M. Brown). Slightly infected P. resinosa was received from Walkerton, Ont. (I.L. Conners).

Blister Rust (Cronartium spp.). Galls of C. ?quercuum were abundant on one tree in a grove of P. sylvestris at Fort Garry, Man. (A.M. Brown). A specimen of C. ribicola on P. Strobus was received from MacGregor Lake, Que., with the information that there was a scattering of infected trees in the district and that two had been killed on the sender's property; in the specimen received the infected area had been largely eaten away (H.N. Racicot). Half the trees were infected in a small grove of P. Strobus in York Co., N.B. The disease is widespread, but the scarcity of white pines makes it unimportant except where these trees have been planted for ornament or where attempts have been made to re-establish stands (J.L. Howatt).

PLATANUS - Plane Tree

Anthracnose (Gnomonia veneta). Twig blight was severe on a tree in the Macoun Memorial Garden, C.E.F., Ottawa, Ont., and moderate on two trees in the Arboretum in early July; at that date there were no fruiting lesions on the leaves, but numerous small specks suggested that infection had occurred (D.B.O. Savile).

POPULUS - Poplar

Leaf Blight (Fusicladium radiosum) was seen on Populus sp. at Kentville, N.S.; it was apparently general (J.F. Hockey). Not previously reported from N.S. in the Survey.

Leaf Spot (Marssonina Castagnei) was general on young native poplars near Okanagan Lake, B.C. (G.E. Woolliams). It was severe and caused defoliation of P. tremuloides at Melfort, Sask. (H.W.M.). At Ottawa, Ont., this disease was very severe on P. alba, defoliation of the lower branches starting in July and being complete on some trees by mid-August. It was also heavy on P. tremuloides in the district, causing some defoliation in late August. In the fall defoliation of all but the uppermost few feet of the larger trees was noticeably hastened (D.B.O. Savile). P. grandidentata was moderately heavily attacked at Elgin Road, Que. (I.L. Conners) and at Springfield, N.S. (J.F. Hockey).

Rust (Melampsora albertensis) was general on P. tremuloides at Summerland, B.C. (G.E. Woolliams).

Leaf Spot (Septoria spp.). S. populicola was found on P. trichocarpa adjacent to Okanagan Lake, B.C. (G.E. Woolliams). S. musiva was widespread and severe on P. balsamifera at Fort Garry, Man. P. ?populicola was moderately heavy on the same host at Bird's Hill; spores curved, 3-4-septate, 45-77.5 x 3-4.5 microns (B. Peturson, W.L. Gordon). S. populicola was conspicuous on P. tacamahacca at Black L., Megantic Co., Que. (Ruth Macrae).

Yellow Leaf Blister (Taphrina aurea) was seen on a few trees of P. nigra at North Saanich, B.C. (W. Jones).

Powdery Mildew (Unicinula Salicis) was heavy on P. grandidentata at Elgin Road, Que. (I.L. Conners).

PRUNUS

Shot Hole (Cercospora circumscissa) was severe on P. sp. (?nigra) at Fort Garry, Man. (W.L. Gordon).

Shot Hole (Cylindrosporium lutescens) was severe on P. virginiana at Somerset, Man. (W.A.F. Hagborg, W.L. Gordon).

Fomes applanatus was found fruiting on the trunk of P. virginiana at Fort Garry, Man. (W.A.F. Hagborg).

Powdery Mildew (Podosphaera Oxyacanthae) slightly affected P. emarginata at North Saanich, B.C. (W. Jones).

Twig Blight (Sclerotinia fructicola) was common on P. virginiana at Fort Garry, Man. (W.A.F. Hagborg).

QUERCUS - Oak

Anthracnose (Gnomonia veneta) was light on the leaves of one tree of Q. alba in the Arboretum, Ottawa, Ont. (D.B.O. Savile).

Leaf Spot (Marssonina Martini). A light, general infection occurred on Q. macrocarpa at Fort Garry, Man. This disease has become more common in recent years (W.L. Gordon).

Leaf Spot (Phyllosticta phomiformis Sacc.) severely damaged the younger leaves of Q. macrocarpa at Fort Garry, Man.; spores mostly 10-15 x 4-6 microns, smaller than usual; known previously in Man., but not reported in the Survey (W.L. Gordon).

Leaf Blister (Taphrina caerulescens) was heavy on a specimen of Q. borealis received from Bewdsley, Ont. (Ruth Macrae).

RHAMNUS - Buckthorn

Rust (Puccinia coronata). A light infection occurred on R. cathartica at Starrs Point, N.S. (R.M. Lewis). A trace only was seen on this host in P.E.I. (R.R. Hurst).

Mosaic (virus) severely damaged several bushes of R. cathartica in a hedge at Charlottetown, P.E.I. (R.R. Hurst).

SALIX - Willow

Tar Spot (Rhytisma salicinum) was common at North Saanich, B.C. (W. Jones).

Die Back (Valsa ambiens) affected a number of branches of S. alba var. vitellina at Fort Garry, Man. Valsa spores 20-25 x 5-6 microns, Cytospora spores 5-10 x 1.5-2 microns (T. Johnson, W.L. Gordon).

SAMBUCUS - Elder

Crown Rot (? Fusarium sp.). Specimens of S. ?pubens were sent to Ottawa in Oct. by R.C. Russell from the Forest Nursery Station, Sutherland, Sask., with the statement that the shrubs had been dying a limb at a time during the summer. Isolations yielded Fusaria identified by W.L. Gordon as F. Solani, F. avenaceum and F. sporotrichioides (Ruth Macrae). In July a shrub of S. racemosa at Government House, Winnipeg, Man., suddenly wilted after two hot days; isolations from the rotted stem bases yielded F. Solani and F. Scirpi var. acuminatum; the former organism has been previously isolated from similar rots of other plants and is suspected of being the pathogen (W.L. Gordon).

Leaf Spot (Septoria sambucina) was very heavy on S. racemosa at Dropmore, Man., and light at Winnipeg; spores 42.5-80 x 2.5-3 microns (W.L. Gordon).

SHEPHERDIA

Leaf Spot (Cercospora manitobana J. J. Davis) was collected at Brandon and Morden, Man., in 1944 on S. argentea; spores 30-80 x 5.7-8.0 microns, 1-2-septate, at Brandon, and 40-125 x 5-7 microns at Morden; conidiophores up to 115 microns long, in dense coremioid fascicles; known from Sask. and Man. on Elaeagnus argentea, but not on Shepherdia (W.L. Gordon).

Leaf Spot (Septoria Shepherdiae) was found on S. canadensis in Hants Co., N.S. (J.F. Hockey).

ULMUS - Elm

Dutch Elm Disease (Ceratostomella Ulmi). In 1945 an intensive scouting programme to determine the limits of distribution of this disease in Que. was carried out on a co-operative basis by the Dominion Department of Agriculture and the Quebec Department of Lands and Forests. Less intensive scouting was also done in Ont., over a large area of the southern part of the province, and a limited amount of work was carried out in N.B. and N.S. The

results of this work indicated that the infected area was confined to Que. and that the disease was well established there. Infected trees were found from near the city of Quebec to Lachine and from Richmond to St. Gabriel, or in an area about 160 miles long by 80 miles at its maximum width. The centre of the infection appears to be Sorel and it is evident from the size of the infected area that the disease has been present for a considerable period of time - possibly 10 years. To date only the native elm bark beetle (Hylurgopinus rufipes Eich.) has been found in Que. This beetle is not supposed to be as effective a vector as the smaller European elm bark beetle (Scolytus multistriatus Marsh.) which is present in the United States, but in view of the widespread occurrence of the disease in Que. this view appears to be open to question.

Altogether a total of 1349 infected trees has been located. In an effort to confine the disease to its present known limits, or at least to retard its spread, a policy of eradication of diseased trees has been adopted, and to date practically all known infected trees have been destroyed. The felling of large trees, particularly in cities, towns, and villages, is a difficult and expensive operation, but in view of the high sconic and commercial value of elm it is felt that such a policy is justifiable. The effectiveness of such a course in arresting or retarding the spread of the disease can only be determined by studying its progress from year to year (A.W. McCallum).

Black Spot (Gnomonia ulmea) was common on leaves of U. americana at Fort Garry, Man. Perithecia with immature spores were found in overwintered leaves on the ground on 31 March 1945; although it has always been assumed that the perithecial stage was formed in Man., this appears to be the first collection of it (W.L. Gordon). Black spot was prevalent on U. pumila (Harbin strain) at Dropmore (W.A.F. Hagborg). Infection was about 30% on U. americana at Bridgetown, N.S. (J.F. Hockey).

Coral Spot (Nectria cinnabarina). Heavy rainfall spread this disease to such an extent in hedges of U. pumila at the Botanical Garden, Montreal, Que., that control by pruning was quite impossible. About 200 trees were destroyed (J.E. Jacques).

Canker (Sphaeropsis ulmicola) was heavy and destructive in a row of trees of U. ?parvifolia at the Station, Charlottetown, P.E.I. (R.R. Hurst). Previously reported from N.B.

Mosaic (virus). A tree of U. americana 25-30 years old at Bridgetown, N.S., showed severe mottling; the leaves were generally smaller and more deeply serrate than normal (J.F. Hockey).

INSECTS

Empusa sp. was seen throughout N.B. on aphids, killing about 10% of the population. Owing to unfavourable weather conditions, mortality was less than usual (J.L. Howatt).

VI. DISEASES OF ORNAMENTAL PLANTS

ACHYRANTHES

Basal Rot (Rhizoctonia Solani) caused severe damage to A. berbonica in a cemetery at Cobourg, Ont., but no disease was reported at several other locations where stock from the same nursery had been used (D.B.O. Savile).

ACONITUM

Yellows (Callistophus virus 1) was severe at the Station, Fredericton, N.B. (D.J. MacLeod).

ALTHAEA ROSEA - Hollyhock

Rust (Puccinia Malvacearum). Fresh infections were found in January at North Saanich, B.C.; damage was considerable during the summer in some gardens (W. Jones). Rust was widespread in the interior of B.C., but severity varied greatly (G.E. Woolliams). Rust caused much damage throughout Ont. (J.E. Howitt). A heavily rusted specimen was received from Kenora. Fresh infections were found near Ottawa on 19 April; the cool wet weather from mid-April to mid-June greatly favoured the disease, although not inducing good growth of the host; rust became very severe in the district (D.B.O. Savile). A few pustules were seen on 17 April at the Botanical Garden, Montreal, Que., on overwintered leaves (J.E. Jacques). Many enquiries from eastern Ont. and Que. indicated that rust was severe (I.L. Conners). Rust was heavy and destructive in all gardens at Charlottetown, P.E.I., and was reported from all other districts (R.R. Hurst).

Leaf Spot (Septoria malvicola) occurred on old leaves of hollyhocks at Fort Garry, Man.; spores 30-62.5 x 1.5-2.5 microns (W.L. Gordon).

ANEMONE

Leaf Spot (Ascochyta ?patagonica Speg.). A light infection occurred in a planting of A. riparia at Fort Garry, Man. Spots were purple-brown, irregular; spores 7-12.5 x 2.5-4 microns, continuous to 1-septate commonly biguttulate; fruiting sparsely. Ascochyta patagonica was described as having spores 8-10 x 3-4 microns. We have seen no record of Ascochyta on Anemone in North America, but this might be the fungus reported on Clematis and doubtfully ascribed to A. clematidina (P.D.S. 23: 105) (W.L. Gordon, D.B.O. Savile).

Rust (Puccinia Anemones-virginianae Schw.) became heavy in a planting of A. riparia at Fort Garry, Man. (W.L. Gordon). Common on wild anemones, but not previously reported in the Survey.

ANTHEMIS

Yellows (Callistephus virus 1) was serious in plantings of A. tinctoria at Winnipeg, Man.; first report to the Survey on this host (W.L. Gordon).

ANTIRRHINUM - Snapdragon

Rust (Puccinia Antirrhini) was seen in various parts of the Okanagan Valley, B.C., but was not severe (G.E. Woolliams). Infection was moderately heavy in a greenhouse in Montreal, Que. (J.E. Jacques).

Sclerotinia Rot (S. sclerotiorum) was heavy and widespread in a market garden near Charlottetown, P.E.I. (R.R. Hurst).

Wilt (Verticillium Dahliae) affected a few plants in coastal B.C.;

the organism was isolated (W.Jones). V. sp. attacked all the snapdragons in a garden near Charlottetown, P.E.I. (R.R. Hurst).

Leaf Curl and Mosaic (virus). Seven plants at the Station, Fredericton, N.B., developed a severe rolling, downward curling and veinal mottling of the leaves. When scions from affected plants were grafted to healthy snapdragons identical symptoms were produced in 30-40 days. Four of the inoculated plants were so weakened and stunted that they produced practically no flowers. The virus has not been identified (D.J. MacLeod).

AQUILEGIA - Columbine

Leaf Spot (Actinonema Aquilegiae (Thum.) Grove) caused moderate damage to A. sp. at Agassiz and Elk Lake, B.C. Spores 8-21 x 2.5-4 microns, 0-2-septate, mostly 15 x 3.5 microns, 1-septate; this material is typical of Actinonema, the radiating hyphae being clearly visible, and agrees well with Grove's description and illustration (British Stem and Leaf Fungi, 2: 269). First report to the Survey but it is recorded from Man. by Bisby et al. (Fungi of Manitoba and Saskatchewan) as Marssonina Aquilegiae Dearn. Roum. Fungi Sel. 2489. (Phyllosticta Aquilegiae Roum. & Pat.) is indistinguishable from the B.C. material. The fungus on Delphinium reported from Sask. (P.D.S. 21: 90) as Ascochyta Aquilegiae (Rabh.) v. Hohn. is a true Ascochyta, but this name is antedated by A. Aquilegiae (Roum. & Pat.) Sacc. and both are apparently the Actinonema; the correct name for the Delphinium fungus therefore remains in doubt (W. Jones, D.B.O. Savile).

Powdery Mildew (Erysiphe Polygoni) was heavy in a planting of hybrid columbines at Fort Garry, Man. (W.A.F. Hagborg, W.L. Gordon).

ASTER

Downy Mildew (Basidiophora entospora). A light infection occurred on A. novae-angliae in a few gardens near Ottawa, Ont. A little was also seen on wild A. cordifolius at Ottawa (D.B.O. Savile).

BEGONIA

Spotted Wilt (virus). What appeared to be this disease attacked several plants in a greenhouse at Fort Garry, Man. (J.E. Machacek). Six plants were attacked at the Botanical Garden, Montreal, Que. (J.E. Jacques).

BERBERIS - Barberry

Rust (Puccinia graminis). Pycnia were first seen on B. vulgaris at Fort Garry, Man., on 20 June; aecia developed late in July; cultures yielded P.g. Tritici, P.g. Avenae and P.g. Secalis (T. Johnson). At the Botanical Garden, Montreal, Que., aecia were fairly abundant on B. aggregata, B. brachypoda, B. Brotschneideri, B. heteropoda, B. Poiretii var. weichangensis, B. sibirica and B. Thunbergii (J.E. Jacques). Rust was very scarce on B. vulgaris at Charlottetown, P.E.I. (R.R. Hurst)

Wilt (Verticillium sp.) had attacked and was killing about half the bushes in a large planting of columnberry barberry (? B. Thunbergii var. pluriflora) in a nursery in Louth Twp., Ont. The disease is thought to have been favoured by the wet spring (G.C. Chamberlain). An entire hedge of B. Thunbergii was attacked in Queens Co., P.E.I. (R.R. Hurst).

BERGENIA

Leaf Spot (Phyllosticta ?Saxifragarum) was severe in a clump of B. cordifolia at Fort Garry, Man. The affected areas of the leaves crack in the later stages (W.L. Gordon).

BOLTONIA

Streak (virus) has been under observation at the Station, Fredericton, N.B., for 5 years. It was severe this year. It has spread rapidly and in 1945 it attacked 95% of the plants in one section of the border and 60% in another (D.J. MacLeod).

CALENDULA

Powdery Mildew (Oidium sp.). Some infection occurred on C. officinalis at Fort Garry, Man., in 1944. No perithecia were formed (W.L. Gordon).

Yellows (Callistephus virus 1) was severe at Fredericton, N.B. (D.J. MacLeod). It attacked all the plants in a garden at Charlottetown, P.E.I. (R.R. Hurst).

CALLISTEPHUS CHINENSIS - China Aster

Wilt (Fusarium oxysporum f. Callistephi). Moderate damage occurred in a garden at Edmonton, Alta. Resistant varieties in other gardens were unaffected (A.W. Henry). It was common and very destructive in Ont. (J.E. Howitt).

Yellows (Callistephus virus 1) caused slight to moderate damage in several gardens in Edmonton, Alta. (M.W.C.). Yellows was seen on China aster in several sections of Ont. (J.E. Howitt). It was less abundant than during the last 2 years at Ottawa (D.B.O. Savile). Yellows was general on China aster in York, Sunbury and Westmorland Co., N.B. One grower raised disease-free plants successfully under muslin. Yellows was severe in the border at the Station, Fredericton, on Aconitum, Calendula, Coreopsis, Cosmos, Helichrysum, Phlox Drummondii, and Tagetes. It was common in York, Sunbury and Westmorland Co. on Chrysanthemum Leucanthemum, Erigeron annuus, Leontodon autumnalis, Matricaria suaveolens, Plantago major, Sonchus arvensis, and Spergula arvensis (D.J. MacLeod). Very few asters are grown at Charlottetown, P.E.I., but infection was 100% in one garden. It was also seen on Centaurea, Plantago, and Chrysanthemum Leucanthemum (R.R. Hurst).

CAMPANULA

Rust (Coleosporium Campanulae) was severe on C. persicifolia in one garden at Saanichton, B.C. (W. Jones). A moderate infection occurred in June, 1945, on the one clump of C. rapunculoides found to be rusted in 1944 at Ottawa, Ont. In Aug. some rust developed in a few other clumps in the district (D.B.O. Savile).

Leaf Spot (Phyllosticta ?alliariaefoliae Allescher) was found on C. persicifolia in 2 gardens near Ottawa, Ont. Infection was light, but the individual lesions were large and often killed the entire distal part of the leaf. The fungus seems to be closest to this species, but the spores are somewhat narrow (D.B.O. Savile).

Leaf Spot (Ramularia macrospora) caused considerable damage to C. ?persicifolia at Saanichton, B.C. (W. Jones).

CENTAUREA

Rust (Puccinia Cyani) was severe on C. Cyanus in one garden at North Saanich, B.C. (W. Jones).

CHEIRANTHUS - Wallflower

Downy Mildew (Peronospora Cheiranthi) caused moderate damage to C. Cheiri in one garden at Sidney, B.C. (W. Jones).

CHRYSANTHEMUM

Canker (Phoma sp.) attacked one variety out of several in Grantham Twp., Ont. Infection occurred through the top of the cutting and partly girdled the shoot. The fungus was found in the phloem, xylem and pith (R.S. Willison).

Leaf Spot (Septoria Chrysanthemi) caused slight damage to C. morifolium in a garden at Agassiz, B.C. (W. Jones).

Wilt (Verticillium sp.) caused moderate damage in a greenhouse at Edmonton, Alta. A fungus close to V. Dahliae was isolated (M.W. Cormack). Specimens were received from 2 greenhouses in Ont., the owners reporting a large proportion of their crops to have been destroyed (J.E. Howitt).

CLEMATIS

Chlorosis (lime-induced) was severe in a planting of C. sp. at Fort Garry, Man. (J.E. Machacek).

CONVALLARIA MAJALIS - Lily-of-the-Valley

Leaf Spot (Ascochyta majalis Massal.). A specimen received from Orillia, Ont., showed numerous elliptical spots, to 2 cm. long and with a water-soaked margin, on the leaves; sparse, inconspicuous pycnidia 150-190 microns in diameter occupied the centre of the spot. Spores were 12-36 x 5-6.5 microns with 0-2 septa, hyaline. The shorter, continuous spores agree with the dimensions given for Phyllosticta cruenta (Fr.) Kickx (14-18 x 5.5-7 microns). A majalis was described as having spores 1-septate 18-24 x 4-6 microns; it was published during 1900, but the exact date is in doubt. D. Sacc. Myc. It. 960, collected in 1901 by Massalongo at the type locality has spores 11.5-28.5 x 5-6.5 microns, with 1-2 (-3) septa, and is clearly identical with our fungus. Septoria majalis Aderhold was published in Centralbl. f. Bakt. usf. 2 Abt. Bd. 6: 631, which was issued on 12 Oct., 1900. From the description and illustrations this must be the same organism. Strictly speaking the fungus should be placed in Stagonospora, but the authority for the combination remains in doubt until it can be determined whether or not Massalongo's name antedates Aderhold's. The occurrence of the disease in Pennsylvania has been reported by Anna E. Jenkins (Phytopath. 32: 259-261. 1941), but this is the first report from Canada (D.B.O. Savile).

Blight (Botrytis cinerea) was very destructive in a bed under trees at the Central Experimental Farm, Ottawa, Ont. In addition to numerous small, red-brown spots, commonly sterile, there were large, dark brown lesions, on which the fungus fruited freely, and which commonly involved most of the leaf and sometimes the lower part of the scape. W.C. Moore (Diseases of bulbs. Bull. 117. Brit. Min. Agr. and Fisheries. 1939) discusses the identity of the pathogen. In this material the fungus was definitely of the cinerea type, both in morphology and in cultural characteristics. Less severe outbreaks were seen in several gardens in the district. Sterile, red-brown spots are commonly seen on C. majalis in this district, and it is now thought that much of this trouble may be due to Botrytis; apparently the wet, cool weather in May and early June stimulated the fruiting of the fungus. First report to the Survey. See also Lilium (D.B.O. Savile).

Anthracnose (Gloeosporium Convallariae Allescher) was seen in a few gardens in Ont. (J.E. Howitt). First report to the Survey.

COREOPSIS

Yellows (Callistephus virus 1) was severe at Fredericton, N.B. (D.J. MacLeod). It was seen occasionally in Queens Co., P.E.I. (R.R. Hurst).

COSMOS

Yellows (Callistephus virus 1) was severe at Fredericton, N.B. (D.J. MacLeod).

CYCLAMEN

Basal Rot (Pythium sp.). A severely rotted specimen of C. indicum was received from Strathroy, Ont. The extent of the disease was not started (D.B.O. Savile).

DAHLIA

Spotted Wilt (virus) attacked 15 out of 50 plants at St. James, Man.; first record in Man. (J.E. Machacek). It was severe at the Botanical Garden, Montreal, Que.; infection is believed to have occurred in the greenhouse, where the disease was present (J.E. Jacques).

DAPHNE

Anthracnose (Marssonina Daphnes) caused considerable defoliation of D. Mezereum in a garden at Cowichan, B.C. (W. Jones).

DELPHINIUM

Leaf Spot (Ascochyta sp.). See discussion of Actinonema Aquilegiae under Aquilegia. Conceivably these fungi are different phases of the same organism; the spores are similar and the hosts closely related; but lacking evidence of identity, it seems preferable to carry the fungus on Delphinium as Ascochyta sp. (D.B.O. Savile).

Fasciation (?Corynebacterium fascians (Tilf.) Dowson). Four plants in the border at the Station, Fredericton, N.B., showed severe fasciation and died prematurely. The condition was not transmitted by grafting (D.J. MacLeod).

Powdery Mildew (Erysiphe Polygoni). Foliage infection was heavy in a planting at Ochre River, Man.; the mildew was heavily parasitized by Cicinobolus Cesatii. All plants in a large clump at Clearwater Bay, Ont., were prevented from flowering by a severe early infection of the young leaves and shoots; first record from this district (W.L. Gordon). This type of infection may be the result of abundant inoculum overwintering in the clump; (P.D.S. 24: 108. 1945).

Bacterial Blight (Pseudomonas delphinii) caused considerable damage to perennial larkspurs at Ontario Agricultural College, Guelph, and specimens were received from various parts of Ont. (J.E. Howitt). Odd plants were attacked at the Botanical Garden, Montreal, Que. (J.E. Jacques). It was common in gardens in Queens Co., P.E.I., infection ranging from a trace to heavy (R.R. Hurst).

Crown Rot (?bacteria). A trace occurred in a planting at Dauphin, Man. (J.E. Machacek).

DIANTHUS

Seedling Blight (Alternaria Dianthi) caused damping-off of seedlings of D. Caryophyllus in a few flats at Elk Lake, B.C. (W. Jones).

Bud Rot (Botrytis sp.) occurred in a garden at Saskatoon, Sask., in Aug. (T.C. Vanterpool).

Basal Rot (?Fusarium sp.). Three plants of D. Caryophyllus received from Brampton, Ont., showed purple-brown lesions at the base of the stems. Fusarium sp. fruited on the lesions in a moist chamber. The plants were stunted and the lower leaves were yellow or dead, but the roots were normal (D.B.O. Savile).

Root Rot (?Fusarium sp.). A specimen of D. barbatus was received from Montreal, Que. (D.B.O. Savile).

Basal Rot (Rhizoctonia Solani) caused heavy loss of D. barbatus in a garden at St. Vital, Man., for the second successive year. Odd plants were killed at Winnipeg (J.E. Machacek).

Rust (Uromyces caryophyllinus). A light infection occurred on D. Caryophyllus received from Brampton, Ont. (D.B.O. Savile).

ERANTHIS - Winter Aconite

Smut (Urocystis Anemones (Tubercinia Eranthis (Pass.) Liro). Leaves of E. cilicica received from Dr. H.T. Güssow, Cadboro Bay, B.C., bore lesions of this smut on the petioles; first report to the Survey (I.L. Conners).

ERYSIMUM

White Rust (Cystopus candidus) was very heavy in a single clump of E. sp. in a rock garden at the Central Experimental Farm, Ottawa, Ont., in late June. Defoliation was nearly complete and many stems were dying from girdling. First report to the Survey (D.B.O. Savile).

EUPHORBIA - Spurge

Stem Rot (Coniothyrium Euphorbiae (Roum.) Berl. & Vogl.) caused the loss of many plants of E. lactea at the Botanical Garden, Montreal, Que. (J.E. Jacques).

FILIPENDULA

Leaf Spot (Phyllosticta Ulmariae Thuem.). A leaf spot was common on F. Ulmaria at Fort Garry, Man., in 1944 and 1945. Specimens collected 21 Aug. 45 bore sparse spiphyllous pycnidia with hyaline spores 2.7-5.5 x 1.2-2.2 microns; intermixed were a few Septoria spores 15-22.5 x 1.2-1.7 microns. Possibly the Septoria had predominated earlier and the Phyllosticta is a microconidial stage. The species described on this or related hosts are doubtfully distinct. P. Ulmariae is reported to have spores 3.5-5 x 2-2.5 microns. The Septoria might be S. quevillensis Sacc., described as having spores 30-40 x 1-1.5 microns (W.L. Gordon, D.B.O. Savile).

GAILLARDIA

Smut (Entyloma Compositarum) was found on G. aristata in 2 new locations in the Ottawa district, Ont.; one colony, heavily infected for 2 seasons, had been uprooted by the owner; infection was lighter than in 1944 (D.B.O. Savile).

Yellows (Callistephus virus 1) was severe at Fredericton, N.B. (D.J. MacLeod). Scattered plants were severely damaged in Queens Co., P.E.I. (R.R. Hurst).

GLADIOLUS

Grey Mould (Botrytis sp.) caused considerable damage to Picardy but not to other varieties at Steveston, B.C. (W. Jones, F. Jensen).

Yellows (Fusarium oxysporum). Severe damage was reported in a planting at Viking, Alta. A Fusarium resembling that described by Lucia McCullough (Phytopath. 34: 263-287. 1944) was isolated from most of the corms received. It was isolated from corms of Hindenburg's Memory from Lethbridge (M.W. Cormack). Some plantings in Man. were moderately affected, but yellows was much less injurious than in 1944 (W.L. Gordon). Specimens were received from Kingston and Walkerton, Ont., with reports that infection was heavy in some varieties (D.B.O. Savile).

Penicillium Rot (P. Gladioli). Slight damage occurred in one lot of stored corms at Edmonton, Alta. (M.W. Cormack).

Scab (Pseudomonas marginata). A moderate infection occurred in a planting at Dryden, Ont. (J.E. Machacek). It was found to be widespread on the stored corms at the Botanical Garden, Montreal, Que., in Dec. 1945 (J.E. Jacques). Specimens were received from St. Lambert and Lanoraie (D.B.O. Savile).

Dry Rot (Sclerotinia Gladioli) was severe on specimens received from Walkerton and Ottawa, Ont. Specimens were also received from Burlington and Hamilton, Ont., and Lanoraie and Marieville, Que. (D.B.O. Savile).

Bacterial Blight (Xanthomonas gummisudans). Specimens were received from Orillia, Ont. It was heavy, but with sparse exudate, on some varieties in the Arboretum, Ottawa, causing moderate damage; the development by varieties, with adjacent varieties often unaffected, suggested that the organism had overwintered on the corm scales (D.B.O. Savile).

Mosaic (?virus). Odd plants at Winnipeg, Man., showed chlorotic spots that later turned red-brown; the disease is becoming abundant (J.E. Machacek). A single plant out of several rows at Joliette, Que., showed a severe mottle and flower breaking (D.B.O. Savile).

Drooping and Crookedness (water lack). Specimens were received from Delhi, Ont. This trouble can apparently be caused by drought, root injury, or possibly a heavy application of fertilizer, which causes a temporary flaccidity (D.B.O. Savile).

Flecking (cause unknown) affected 75% of Picardy and a few plants of Sensation at Toronto, Ont.; the flowers were severely damaged but there was little or no leaf mottle (D.B.O. Savile).

GOSSYPIUM - Cotton

Foot Rot. Pythium sp. was isolated from a foot rot of young potted ornamental cotton plants at Winnipeg, Man.; all plants were eventually killed (W.L. Gordon).

HELICHRYSUM - Everlasting

Yellows (Callistephus virus 1) was severe at the Station, Fredericton, N.B. (D.J. MacLeod). It was occasionally seen in Queens Co., P.E.I. (R.R. Hurst).

HESPERIS - Rocket

Downy Mildew (Peronospora Hesperidis). Small amounts were found on the lower leaves of H. matronalis at Westboro and Ottawa, Ont., early in the summer; numerous sterile spots on some plants may have been due to this fungus (D.B.O. Savile).

HYACINTHUS - Hyacinth

Bulb Eelworm (Ditylenchus dipsaci). Traces occurred in 4 plantings in B.C. (R.J. Hastings, J.E. Bosher).

IBERIS - Candytuft

Club Root (Plasmodiophora Brassicae). One severely damaged plant was seen in Queens Co., P.E.I. (R.R. Hurst).

IRIS

Colletotrichum ?Liliacearum (West.) Ferrar. was found fruiting on leaves of iris suffering from a basal rot at Winnipeg, Man., spores 20-25 x 3.5-4 microns. Previously recorded in Man. on Smilax (W.L. Gordon). It is doubtful whether this is a parasite; the specimen bears Botrytis and other fungi also; spores 2.0-3.2 microns wide in lactophenol (D.B.O. Savile).

Leaf Spot (Didymellina macrospora) was widespread in coastal B.C. At the Agassiz Experimental Farm it was severe on Thorlock, Quaker Lily, Dora Langdon, Camlot, Maroi King and Albert Victor, and slight on Mary Garden and Rodney (W. Jones). Of the bulbous iris plantings inspected in coastal B.C., 10% showed a moderate infection, 3% a trace, and 87% were free (R.J. Hastings, J.E. Bosher). Leaf spot was general in the interior (G.E. Woolliams). Infection was light but general at Brooks, Alta. (M.W.C.). Infection was moderate to severe on I. germanica and severe on seedlings at Dropmore, Man. (W.A.F. Hagborg). A scattered infection was seen at St. Catharines, Ont., with slight damage (G.C. Chamberlain). A considerable amount of leaf spot developed near Ottawa early in the summer but was then checked by drier weather (D.B.O. Savile). It was very prevalent in a nursery of I. germanica at the Botanical Garden, Montreal, Que. (J.E. Jacques). Leaf spot was severe at Kentville, N.S., apparently spreading rapidly during the wet spring (J.F. Hockey). It varied from a trace to severe in Queens Co., P.E.I. (R.R. Hurst).

Soft Rot (Erwinia carotovora). Specimens were received from Elora and Britannia Heights, Ont. It was severe in one corner of a large planting at Westboro. The cool, wet weather of April and May was presumably responsible for these outbreaks (D.B.O. Savile). Odd plants were severely affected at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Root Rot (Fusarium sp.) attacked I. sibirica at Saskatoon, Sask. The rhizomes were unaffected (T.C. Vanterpool).

Ink Disease (Mysterosporium adustum). Infection was 60-100% in 2 plantings of Wedgewood in the ground for the second year on Vancouver Island, B.C.; damage was slight (R.J. Hastings, J.E. Bosher).

Bulb Rot (Penicillium sp.) affected 19 out of 79 plants of Wedgewood received from a greenhouse at Port Credit, Ont.; the plants were from a shipment of 300,000 from B.C. (D.B.O. Savile).

Basal Rot (?Rhizoctonia Solani). Odd clumps of I. Kaempferi at Dropmore, Man., showed wilting following decay of the leaf bases; roots and rhizomes appeared to be unaffected; R. Solani was associated with the disease (J.E. Machacek).

Mosaic (virus). Examination of Wedgewood plantings in coastal B.C. showed 25% with severe infection (20%-100%), 16% with moderate infection (1%-20%), 28% with slight infection, and 31% free (R.J. Hastings, J.E. Bosher). Infection was 88% in specimens from Port Credit, Ont., that were claimed to be a random sample from a shipment of 300,000 bulbs from B.C. (D.B.O. Savile).

KALANCHOE

Powdery Mildew (Oidium sp.) was heavy on a potted plant seen at Saskatoon, Sask., in Nov. It had been kept out of doors in the shade during the summer (T.C. Vanterpool).

LATHYRUS

White Mould (Erostrotheca multiformis) was general on the lower leaves of L. odoratus at St. Catharines, Ont., that had been grown under cloth; previously reported from B.C., and known in eastern U.S. (G.C. Chamberlain, I.L. Conners).

Streak (Erwinia lathyri). Infection was light to moderate in several gardens at Edmonton, Alta. (M.W.C.). A heavy infection occurred in Queens Co., P.E.I. (R.R. Hurst).

Root Rot (Fusarium sp.). Two plants were received from Lacolle, Que. (D.B.O. Savile).

Mosaic (virus). Infection was 10% in a large planting at Westboro, Ont. (D.B.O. Savile).

Bud Drop (excess nitrogen). Traces only were seen in one garden in P.E.I. (R.R. Hurst).

LILIUM - Lily

Blight (Botrytis elliptica). At the Station, Saanichton, B.C., damage was moderate on L. candidum and L. speciosum, slight on White Queen, and a trace on L. longiflorum and various hybrids (W. Jones). A few plants of L. sp. were found to be dying in a planting at Olds, Alta. (M.W.C.). Blight was very prevalent on L. regale at O.A.C., Guelph, Ont., and it was reported as serious from other districts (J.E. Howitt). B. elliptica was heavy on L. Henryi and a trace on several other spp. at the Central Experimental Farm, Ottawa. B. cinerea caused slight damage to L. sp. close to severely blighted Convallaria. B. elliptica was severe in specimens of L. candidum received from L'Assomption and Joliette, Que. (D.B.O. Savile). Blight was heavy and prevented blooming of L. regale at Summerside, P.E.I. (R.R. Hurst).

Leaf Spot (Cercosporella inconspicua (Wint.) v. Höhn.) was severe on L. Martagon x Hansoni in a nursery at Dropmore, Man.; spots oval, about 1 cm. long, light brown, sharply delimited; conidiophores amphigenous, in small fascicles, from very short to about 100 x 3-4 microns, smooth, flexuous, regularly septate and with a single apical hilum, sometimes resembling conidia; conidia 49-139 x 2.7-5.2 microns, straight or curved, scarcely obclavate, 2-7-septate. As pointed out by Lindau (Rabenhorst's Kryptogamen-Flora, 2nd ed., 1: 8: 421), von Höhnel showed that Cylindrosporium inconspicuum Wint. was a Cercosporella and identical with C. hungarica Bäuml. The latter was published in 1883, but Winter's fungus was issued with diagnosis in Rab.-Wint.-Paz. Fungi Eur. 3178 in 1884. C. liliicola (Rich.) Sacc. from France and C. Lilii Dearn. from N.Y., both on L. candidum, may be the same; they are incompletely described and have not been seen. Moore (Brit. Min. Agr. and Fish. Bull. 117) suggests that the report of Cercospora unicolor (described from Laurus) on lily from Fla. may also refer to this fungus. This is the first report from Canada (W.A.F. Hagborg, W.L. Gordon, D.B.O. Savile).

Rust (Uromyces Holwayi) was severe on Cyrus Gates and Peter Fuget at Cobble Hill, B.C., and slight on White Queen at Saanichton (W. Jones).

Mosaic (virus). Severely mottled plants of L. tigrinum and L. philadelphicum were received from Dropmore, Man.; the latter species also showed yellowing (D.B.O. Savile).

LIMONIUM - Sea Lavender

Rust (Uromyces Limonii) caused considerable defoliation in a few plants of L. latifolium being grown for seed at Brentwood, B.C. (W. Jones).

LONICERA - Honeysuckle

Leaf Spot (Cercospora antipus Ell. & Holw.) was common and caused moderate damage to L. ciliosa at North Sadnich, B.C. Not previously reported in the Survey, but reported by Bisby et al. (Fungi of Manitoba and Saskatchewan) from Man. and we have a specimen from Algonquin Park, Ont. In the B.C. specimen conidiophores are 20-30 x 3.5-4 microns, brown, geniculate, hypophyllous; conidia 19-98 x 3.0-3.8 microns, 0-2(-4)-septate, faintly brownish, often catenulate. Fungi Columb. 4806 has spores 19-66 x 2.5-3.8 microns, 0-3-septate, brownish, often catenulate. DAOM 14665 (TRT 17144) on L. hirsuta has conidiophores 38-110 x 3.5 microns, dark brown geniculate; conidia 23-73 x 3.0-3.8 microns, 0-4-septate, brownish, generally catenulate. All three specimens are unquestionably identical; this is not a typical Cercospora, since catenulate spores are conspicuous in all collections (W. Jones, D.B.O. Savile).

Leaf Blight (Glomerularia Loniceae). Leaves on odd twigs of L. tatarica were blighted at Fort Garry, Man. (W.L. Gordon). It caused slight damage to L. tatarica in the Arboretum, Ottawa, Ont., but was heavy on escaped L. spp. in a moister situation nearby (D.B.O. Savile). Leaf blight was common and unusually destructive in York and St. John Co., N.B. (J.L. Howitt).

Powdery Mildew (Microsphaera Alni) infected every bush at the Botanical Garden, Montreal, Que. (J.E. Jacques). A specimen was received from Montreal (D.B.O. Savile). It was observed on honeysuckle at Charlottetown, P.E.I. (R.R. Hurst).

LUPINUS - Lupine

Eye Spot (Ovularia sp.) caused considerable damage to L. sp. in a garden at Brentwood, B.C. (W. Jones).

LYCHNIS

Leaf Spot (Phyllosticta Lychnidis and Septoria Lychnidis). In a nursery at Dropmore, Man., L. chalcedonica showed light infection, with much yellowing of affected leaves, by P. Lychnidis. L. Arkwrightii (L. Haageana x L. chalcedonica) in the same nursery was heavily infected by S. Lychnidis, but uninvaded parts of the leaf were not noticeably affected. This situation, together with the similar finding of P. Lychnidis on L. chalcedonica and S. Lychnidis on adjacent L. Haageana at Ottawa in 1943 (P.D.S. 23: 111), supports the contention of Gilman and Archer (The Fungi of Iowa Parasitic on Plants. Iowa State College Journal of Science 3: 299-502. 1929) that these are merely two phases of a single organism. The Phyllosticta phase seems to predominate on L. chalcedonica, although we have records of Septoria on this host; and the Septoria phase perhaps predominates on other host species (W.A.F. Hagborg, W.L. Gordon, D.B.O. Savile).

LYCIUM - Matrimony Vine

Bunch Top (?virus). A plant of L. halimifolium at the Station, Fredericton, N.B., showed severe rosetting, dwarfing and upward rolling of the top leaves; the affected region was purplish. Cuttings from the affected parts continued to show the symptoms in the greenhouse (D.J. MacLeod).

NARCISSUS

Smoulder (Sclerotinia narcissicola Gregory (Botrytis narcissicola). In coastal B.C. 4% of plantings showed severe infection, 7% moderate infection, 37% a trace, and 52% were free (R.J. Hastings, J.E. Bosher).

Bulb Eelworm (Ditylenchus dipsaci). Ten per cent of plantings in coastal B.C. showed severe infestation, 7% moderate, 12% trace to light, and 71% were free (R.J. Hastings, J.E. Bosher).

Basal Rot (Fusarium sp.) was moderate to severe in 4 plantings in coastal B.C.; the diseased plants were mostly derived from forced stock (R.J. Hastings, J.E. Bosher).

White Mould (Ramularia vallisumbrosae) was severe on Seagull and White Nile in some plantings in coastal B.C.; these varieties seem to be very susceptible. The disease occurs mainly in old or crowded plantings (R.J. Hastings, J.E. Bosher).

Leaf Scorch (Stagonospora Curtisii). Traces are common in coastal B.C. in moist locations. It was seen on Bernardino, Forerunner, King Alfred, and Lady Koster (R.J. Hastings, J.E. Bosher).

Mosaic (virus) was severe in 4% of plantings in coastal B.C., moderate in 11%, trace in 54%, and nil in 31% (R.J. Hastings, J.E. Bosher).

NEMESIA

Root Rot (?Phytophthora sp.). Half the plants in a garden at Edmonton, Alta., were killed. Phytophthora sp. was isolated (M.W. Cormack).

PAEONIA - Peony

Blight (Botrytis Paeoniae) caused considerable damage at the Experimental Farm, Agassiz, B.C. (W. Jones). Slight to moderate damage occurred in a planting at Olds, Alta. (M.W.C.). Slight rhizome infection and blighting of the shoots were seen in a planting at Winnipeg, Man. (J.E. Machacek). Blight did much damage at Ontario Agricultural College, Guelph, and was reported as being serious in several large plantings elsewhere in Ont. (J.E. Howitt). A specimen was received from Brockville. At the Central Experimental Farm, Ottawa, blossom blight (apparently all B. cinerea) was heavy on most varieties; these plants had been 10 years in this location and the disease had received little attention. Wilting and stunting due to B. Paeoniae was serious in most varieties. Of the varieties that were making good bloom, Instituteur Doriat and Jeannot were outstandingly free from both blossom and stem blight (D.B.O. Savile). Specimens and reports indicated that blight was severe at Waterloo, St. Hyacinthe, and St. Bruno, Que. (J.E. Jacques). B. cinerea was abundant on a leaf received from Torryburn, N.B. B. Paeoniae killed all shoots of a clump received from New Aberdeen, N.S., but there was little rotting of the rhizomes (D.B.O. Savile). Considerable bud and blossom blight occurred at Weymouth, Yarmouth and Kentville (J.F. Hockey). Infection varied from a trace to very heavy in Queens Co., P.E.I. One commercial cutting stand was completely destroyed (R.R. Hurst).

Leaf Blotch (Cladosporium Paeoniae) was moderately heavy on a few plants at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Mosaic (virus). A few plants were affected at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Ring Spot (virus) affected 14 plants in a plot at the Station, Fredericton, N.B.; the disease is spreading (cf. P.D.S. 24: 114) and the infected plants are degenerating (D.J. MacLeod).

PAPAVER - Poppy

Smut (Entyloma fuscum). A few lesions could be seen on the first leaves of P. Rhoeas seedlings at Westboro, Ont. on 25 May; by 3 June spots were quite numerous on the first to third leaves of many plants; on 10 June a number of lesions were found in fruit. In all, the disease was found on P. somniferum in two gardens and on P. Rhoeas in about ten in the district. Inoculations resulted in infection of several species of Papaver (cf. Savile. Entyloma fuscum and related smuts attacking Papaveraceae. Canad. Journ. Res. C, 24: in press), but not of other genera of Papaveraceae (D.B.O. Savile).

Root Rot (?Fusarium sp.) affected a single plant of P. somniferum in the Arboretum, Ottawa, Ont. Fusarium sp. fruited heavily on the roots in a moist chamber (D.B.O. Savile).

Bacterial Blight (Xanthomonas papavericola (Bryan & McWhorter) Dowson) was moderately heavy in a large, partly escaped colony of P. Rhoeas at Westboro, Ont. It was heavy in one set of plants of P. somniferum in the Arboretum, Ottawa, but not on adjacent rows of this species from different seed lots, which suggests that the inoculum was seed-borne. The lesions somewhat resemble those of Entyloma fuscum, being round on P. Rhoeas and elongate-angular on P. somniferum, but they are less opaque and lack the hypophyllous weft that is generally seen on the smut lesions. The above is the correct authority for the pathogen, not as given in P.D.S. 24: 114. (D.B.O. Savile). Bacterial blight was collected on P. somniferum at Lachute, Que.; first report from Que. (W.L. Gordon).

Yellows (Callistephus virus 1). A light infection occurred in a planting of P. nudicaule at Fort Garry, Man. (A.M. Brown). Previously reported on P. sp. from N.B.

PARTHENOCISSUS

Powdery Mildew (Unicinula necator) was seen on P. quinquefolia at Charlottetown, P.E.I. (R.R. Hurst).

PELARGONIUM - Geranium

Grey Mould (Botrytis cinerea) caused some trouble in a greenhouse at Saskatoon, Sask. (R.J. Ledingham).

Chlorosis (lime-induced). A planting at Winnipeg, Man., showed severe chlorosis followed by marginal scorching (J.E. Machacek).

PENSTEMON

Leaf Spot (Ascochyta sp.). Leaf spots found in 1944 on P. sp. at Brandon, Man., bore sparse pycnidia with spores 7.0-11.5 x 2.0-3.0 microns, hyaline, cylindric, 0-1-septate. There does not seem to be any record of an Ascochyta on Penstemon. Phyllosticta Pentastemonis Cke., of which this may be a phase, is reported to produce spores 7-10 x 3-3.5 microns on certain host species (W.L. Gordon, D.B.O. Savile).

PETUNIA

Powdery Mildew (?Erysiphe Cichoracearum). The oidial stage was present on a specimen of P. hybrida received from Shoal Lake, Man. (J.E. Machacek). Similar material was received from Barry's Bay, Ont. (D.B.O. Savile).

PHLOX

Powdery Mildew (Erysiphe Cichoracearum) was not particularly severe at Ottawa, Ont.; the cool, wet weather of early summer is thought to have checked its development (D.B.O. Savile). It was severe on several clumps in gardens at Kentville, N.S. (J.F. Hockey).

Leaf Spot (Septoria divaricata) caused considerable defoliation in a row of seed plants at Brentwood, B.C. (W. Jones). A severely infected specimen was received from Dauphin, Man. (W.L. Gordon).

Blight (?virus). Specimens were received from Montreal, Que., with the statement that the disease had been noticed for 3 years in a garden containing 30 varieties of P. paniculata (I.L. Conners). Severe defoliation occurred in nearly all varieties at the Montreal Botanical Garden (J.E. Jacques). One per cent of P. paniculata at the Station, Fredericton, N.B., were affected. Stalks that showed symptoms early in the season generally died; those produced later seemed to develop some tolerance, but showed streaking of petioles and large veins, interveinal mottling, and unevenness of the blades. Infected plants gradually degenerate and are reduced to a few weak stalks after about 6 years (D.J. MacLeod). Blight was very injurious in P.E.I. (R.R. Hurst).

Yellows (Callistephus virus 1) affected a single plant of P. paniculata at the Botanical Garden, Montreal, Que. (J.E. Jacques). Yellows was severe on phlox at the Station, Fredericton, N.B. (D.J. MacLeod).

Virescence (virus). Three plants in a garden at Charlottetown became infected and were removed (R.R. Hurst).

Chlorosis (lime-induced) was present to some extent in a planting of P. paniculata at Dauphin, Man. (J.E. Machacek).

PORTULACA - Purslane

Wilt (Fusarium sp.) killed up to 10% of plants being grown for seed at Grand Forks, B.C. (G.E. Woolliams).

RIBES

Leaf Spot (Septoria sanguinea) was general on R. sanguineum in gardens at Milner and Saanichton, B.C. (W. Jones).

ROSA - Rose

Die Back (Cytospora ambiens). This fungus was associated with a die back of several rose bushes at Winnipeg, Man.; spores 5-7 x 1 micron (W.A.F. Hagborg, W.L. Gordon).

Black Spot (Diplocarpon Rosae) was common but caused slight damage at Saanichton, B.C. (W. Jones). It was noted at Ayama and Salmon Arm; infection was variable according to location and variety (G.E. Woolliams). This disease is prevalent and severe on susceptible varieties every year in the Niagara Peninsula, Ont., causing defoliation before bloom is completed. The following were severely damaged: Christopher Stone, Rev. Page Roberts, Los Angeles, McGredy's Yellow, McGredy's Sunset, Gen. McArthur, Henrich Gaede,

Mrs. Barraclough, Dame Edith Helen, and Smiles Polyantha. Practically all bushes of hybrid teas in a nursery at Port Burwell were defoliated by the end of August (G.C. Chamberlain). Black spot was very destructive to hybrid teas at Ontario Agricultural College, Guelph, and specimens received indicate that it was prevalent throughout the province (J.E. Howitt). Several enquiries concerning its control were received from the Ottawa district; infection was abundant at Ottawa and the spots were often unusually large (I.L. Conners, D.B.O. Savile). Cynthia Brooks was severely affected at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Stem Canker (Leptosphaeria Coniothyrium). Specimens showing large cankers originating from pruning wounds were received from Calgary, Alta. (D.B.O. Savile). Prevalence of dead wood in the spring is commonly associated with stem cankers starting from pruning wounds, in the Niagara Peninsula, Ont. Hybrid teas and polyanthas are affected; Poulsen's hybrid polyanthas seem to be quite susceptible (G.C. Chamberlain).

Leaf Spot (Mycosphaerella rosicola). The small size of the spores of the Phyllosticta reported last year from Man. (P.D.S. 24: 116), the fact that it was collected in Oct., and the similarity in colour of the pycnidium walls with that of the conidiophores of Cercospora r. all suggested that this fungus might be a microconidial stage of Mycosphaerella r. Careful search of the specimen revealed conidiophores and a few spores of Cercospora r. on the same lesions. A collection of Cercospora r. on R. xanthina in the Arboretum, Ottawa, Ont., made on Sept. 21, showed pycnidia on a number of lesions and some of these yielded spores 2.5-4 x 0.7-1 micron; some pycnidia bore conidiophores of the Cercospora. B.H. Davis (Mycologia 30: 282-298. 1938) makes no mention of a microconidial stage, but he does describe and figure "sterile perithecia", bearing conidiophores, in the overwintered material. Further examination of Dr. Gordon's material shows most of the spores to be 2.5-3.5 x 0.7 micron. D. Sacc. Myc. Ital. 1685 (Phyllosticta rosicola) collected by Massalongo at or near the type station has spores 2.5-4 x 0.5-0.9 micron. It agrees well with our collections except that the spots are somewhat larger and the pycnidia very numerous. There is no sign of Cercospora; but the material was collected in Oct. and the whole of every leaflet is brown, the lesions being distinguished mainly by the presence of the pycnidia. It is strongly suspected that Massalongo's fungus is, like our specimens, a microconidial stage of the Mycosphaerella (D.B.O. Savile).

Rust (Phragmidium spp.). At Saanichton, B.C., P. sp. caused moderate damage to New Dawn (W. Jones). P. speciosum was observed on Hansa at Dropmore, Man., and in the Peace Garden on the U.S.--Manitoba border (W.A.F. Hagborg).

Anthracnose (Spaceloma Rosarum) was fairly general at the Experimental Farm, Agassiz, B.C. (W. Jones).

Powdery Mildew (Sphaerotheca spp.). S. Humuli was seen on a few bushes of Dorothy Perkins at Brentwood, B.C. (W. Jones); it was general but not severe in the Okanagan Valley (G.E. Woolliams). S. pannosa was common on ramblers in the Niagara Peninsula, Ont. Buds and stems of Talisman, Pres. Hoover and Etoile de Holland hybrid teas were also affected (G.C. Chamberlain). Mildew was seen in one garden in P.E.I. (R.R. Hurst).

Mosaic (virus). Two bushes of Kirsten Poulsen were infected at St. Catharines, Ont. The bloom was streaked and the foliage showed a definite mosaic pattern (G.C. Chamberlain). One plant of each of the

following were affected by mosaic at the Central Experimental Farm, Ottawa: Dorothy Perkins, Langdon, Maagraf, Philadelphia Rambler, Tuscany and an unnamed seedling (H.N. Racicot).

RUDBECKIA - Coneflower

Powdery Mildew (?Erysiphe Cichoracearum). Specimens of R. laciniata var. hortensia heavily infected with Oidium sp. were received from a florist at Georgetown, Ont., with the statement that all the plants were seriously disfigured (D.B.O. Savile).

SEDUM - Stonecrop

Leaf Spot (Septoria Sedi). A slight infection occurred at Winnipeg, Man., less than in 1944 (W.L. Gordon).

SENECIO

Stem Rot (Fusarium sp.). About 75% of the plants of S. cruentus (cineraria) were attacked in a greenhouse at Montreal, Que. Dull weather and overwatering seem to have favoured the disease (J.E. Jacques).

Basal Rot (Pythium sp.). Two plants of S. cruentus received from North Bay, Ont., showed heavy root infection and abundant mycelium in the pith cavity at the base of the stem. Various varieties were stated to be affected, and wilting was said to have started just as the plants were coming into flower (D.B.O. Savile).

SORBARIA

Leaf Spot (Septoria sp.). Leafs of S. sorbifolia at Brandon, Man., were heavily attacked by Septoria sp. with acicular spores 16-28 x 0.7-1.3 microns; the spots were small, white above and brown below. S. Arunci, S. aschochytoides and S. salicifoliae, whose descriptions suggest that they may all be the same, have much wider spores (W.L. Gordon, D.B.O. Savile).

SYRINGA - Lilac

Blight (Pseudomonas syringae). A shrub at Olds, Alta., was severely blighted; the organism was isolated and produced typical blight in the greenhouse (M.W. Cormack, W.A.F. Hagborg). Blight was moderately severe at Morden, Man., especially on Nokomis and Skinner's Louvois. A light infection was seen at Dropmore, on S. villosa, S. vulgaris and a seedling. The organism was identical with that from Alta. (W.A.F. Hagborg). It was severe in a hedge in Queens Co., P.E.I., and damaged many other bushes (R.R. Hurst).

Graft Blight (lilac-privet incompatibility). Two bushes at the Station, Fredericton, N.B., showed chlorosis and wilting, and finally died. The privet rootstocks remained alive. Seven bushes have been killed by this trouble in the last 6 years (D.J. MacLeod).

TAGETES - Marigold

Yellows (Callistephus virus 1) was severe at the Station, Fredericton, N.B. (D.J. MacLeod). Occasional plants of Flesh and New Orange were infected at Charlottetown, P.E.I. (R.R. Hurst).

TANACETUM - Tansy

Leaf Spot (Ramularia Tanaceti). T. vulgare was moderately attacked at Fort Garry, Man. (W.L. Gordon).

TROPAEOLUM - Nasturtium

Chlorosis (lime-induced) was severe in a planting at Woodlands, Man. (J.E. Machacek).

TULIPA - Tulip

Fire (Botrytis Tulipae). Approximately 10% of plantings in coastal B.C. were free of fire, 65% showed slight infection, and 25% were moderately or severely affected. Fire was more serious than usual owing to abundant rain in April and May (R.J. Hastings, J.E. Bosher). A trace was seen in commercial plantings at Salmon Arm, B.C. (G.E. Woolliams). Fire was again prevalent throughout Ont. (J.E. Howitt). It was exceptionally severe in the Ottawa district; in 2 gardens at Westboro every bloom was marked out of several hundred, and many other gardens were almost as severely affected. Growth started very early but the weather was cool and wet from mid-April through May. Damage was aggravated by the refusal of some gardeners to discard the belief that the primary lesions are a form of frost injury (D.B.O. Savile). Fire was very destructive in a commercial planting at Charlottetown, P.E.I., and damage was slight to severe in many gardens (R.R. Hurst).

Break (virus) is becoming steadily rarer in coastal B.C. due to careful and consistent roguing by most growers. It is common in gardens, partly because many people prefer the broken flowers. A 20% infection of "mosaic" was seen in Inglescombe Yellow at Gordon Head and the disease occurs in other yellow varieties; inoculated into pink or orange varieties it induces breaking and a pronounced mosaic (R.J. Hastings, J.E. Bosher). True yellow varieties get their colour from the ground tissue and lack anthocyanin; breaking is the effect of the viruses on the distribution and abundance of anthocyanin in the epidermal cells; infected yellow or white varieties may, therefore, show little or no change in the flowers. It is questionable whether this disease differs from typical break except in the possible predominance of tulip virus 1 (D.B.O. Savile). A trace to 5% was seen in commercial plantings in the Okanagan Valley; in private gardens infection ran up to 50% or more (G.E. Woolliams).

Chalking (physiological) was slight to moderate in Pride of Haarlem and Princess Elizabeth at Vancouver, B.C.; it was not present in Inglescombe Yellow from the same planting (W. Jones).

VERONICA - Speedwell

Leaf Spot (Ramularia Veronicae) was heavy on V. Teucrium at the Central Experimental Farm, Ottawa, Ont., and moderate in a garden in Highland Park (D.B.O. Savile).

VIOLA

Leaf Spot (Cercospora Violae) was moderately heavy in a large bed of pansies at Ottawa, Ont., that had been sprinkled frequently and received no afternoon sun; considerable defoliation occurred. Some infection was found in 2 gardens at Westboro; only slight damage occurred in the garden that was heavily damaged in 1944, probably because watering was done with a "soil soaker" instead of a sprinkler (D.B.O. Savile).

Anthracnose (Colletotrichum Violae-tricoloris) severely damaged a large bed of pansies at Ottawa, Ont.; lesions occurred on stems as well as leaves; previously reported from N.B. and N.S. (D.B.O. Savile).

Leaf Spot (Phyllosticta Violae) was common on leaves of pansy at Fort Garry, Man., in 1944; in sparse fruit, with spores 5-7.5 x 2-3 microns (A.M. Brown, W.L. Gordon). First report on V. tricolor from Man., but reported by Bisby et al. (Fungi of Manitoba and Saskatchewan) on V. canadensis. Saccardo's form Violae-tricoloris, described as having spores 6 x 2.5 microns, is doubtfully distinct from P. Violae, which was described as having spores 10 microns long; Bisby gives 4-8 x 2-3 microns for his fungus, and a specimen on V. tricolor from N.S. yielded spores 5.5-10 x 1.4-2.8 microns, indicating that variability is much greater than was originally recognized (D.B.O. Savile).

Powdery Mildew (Sphaerotheca Humuli). Infection varied from a trace to heavy on different varieties of V. cornuta and V. tricolor var. hortensis in a garden at Edmonton, Alta. (M.W. Cormack). Mildew varied from light to heavy on pansies in the Ottawa district, Ont.; reduction in bloom was evident where it was heavy (D.B.O. Savile).

ZINNIA

Wilt (Fusarium Solani var. Martii) occurred to a slight extent in gardens and commercial seed plantings at Summerland and Grand Forks, B.C. (G.E. Woolliams).

Yellows (Callistephus virus 1) attacked occasional plants in Queens Co., P.E.I. (R.R. Hurst).

INDEX OF HOSTS

Abies 101
Acer 101
Achyranthes 107
Aconitum 107
Aesculus 101
Alfalfa 22
Althaea 107
Amelanchier 101
Anemone 107
Anthemis 107
Antirrhinum 107
Apple 86
Apricot 90
Aquilegia 108
Asparagus 45
Aster 108

Barley 13
Bean 45
Bean, Broad 49
Beet 47
Beet, Sugar 36
Begonia 108
Berberis 108
Bergenia 108
Betula 102
Blackberry 96
Blueberry 98
Boltonia 109
Broccoli 49
Buckwheat 28

Cabbage 49
Calendula 109
Callistephus 109
Campanula 109
Caragana 102
Caraway 50
Carrot 50
Cauliflower 51
Celery 52
Centaurea 109
Cherry 91
Cherry, Sand 95
Cheiranthus 110
Chrysanthemum 110
Clematis 110
Clover, Common 26
Clover, Sweet 27
Convallaria 110
Coreopsis 111
Corn 29
Corn, Sweet 78
Cornus 102
Cosmos 111
Crataegus 102
Cucumber 52
Currant 95
Cyclamen 111

Dahlia 111
Daphne 111
Delphinium 111
Dianthus 111

Eggplant 53
Elaeagnus 102
Endive 53
Eranthis 112
Erysimum 112
Euphorbia 112

Fagus 102
Filipendula 112
Flax 29
Fraxinus 102

Gaillardia 112
Gladiolus 113
Gooseberry 96
Gossypium 113
Grape 99
Grasses, Cultivated 40

Helichrysum 113
Hesperis 113
Hop 54
Horse Radish 54
Hyacinthus 114

Iberis 114
Insects 106
Iris 114

Juglans 102
Juniperus 103

Kalanchoe 115

Lathyrus 115
Leek 54
Lettuce 54
Lilium 115
Limonium 116
Loganberry 96
Lonicera 116
Lupinus 116
Lychnis 116
Lycium 117

Mangel 36
Melon 55
Millet, Foxtail 36
Mustard, Black 48

Narcissus 117
Nectarine 92
Nemesia 117

Oats 8
Onion 56
Ostrya 103

Paeonia 117
Papaver 118
Parsley 57
Parsnip 57
Parthenocissus 118
Pea 57
Peach 92
Pear 89
Pelargonium 118
Penstemon 118
Petunia 119
Phlox 119
Picea 103
Pinus 103
Platanus 104
Plum 94
Populus 104
Portulaca 119
Potato 59
Prunus 104
Pumpkin 76

Quercus 104

Radish 76
Rape, Argentine 37
Raspberry 97
Rhamnus 105
Rhubarb 77
Ribes 119
Rosa 119
Rudbeckia 121
Rust Nurseries 16
Rusts, Cereal, Physiologic Races 18
Rye 15

Safflower 38
Salix 105
Salsify 77
Sambucus 105
Sedum 121
Senecio 121
Shallot 77
Shepherdia 105
Sorbaria 121
Soybean 38
Spinach 77
Squash 78
Strawberry 99
Sunflower 40
Syringa 121

Tagetes 121
Tanacetum 121
Tobacco 78
Tomato 81
Tropaeolum 122
Tulipa 122
Turnip 84

Ulmus 105

Vegetable Marrow 85
Veronica 122
Vetch 28
Viola 122

Wheat 1

Zinnia 123